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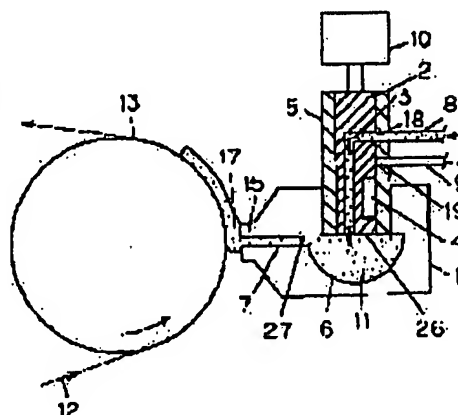
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(54) INTERMITTENT COATING DEVICE AND METHOD AND MANUFACTURE OF CELL ELECTRODE AND NONAQUEOUS ELECTROLYTE SOLUTION CELL

(57)Abstract:

PURPOSE: To prevent thickness of a coating at a coating starting end from becoming larger, in a device for intermittently applying a coating material to a base material which is continuously running by making straight a coating starting end and a coating terminal end which are formed intermittently on the base material.

CONSTITUTION: A base material 12 is caused to continuously run by a roll 13, while a coating material 11 fed to a nozzle 1 is intermittently applied onto the material 12 from a head 2. The head 2 shuts off the flow of the material 11 to the nozzle 1 when the material 11 is not applied, thereby to lead the material 11 to other unit than the nozzle 1 and at the same time, the head 2 draws the material 51 in the nozzle 1 and at the outlet of a slit 7 into a suction part formed in the nozzle 1, so that when coating of the material 11 is restarted, flow of the material 11 is released to the nozzle 1 and at the same time the material 11 having been drawn into the suction part is returned into the nozzle 1.



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CLAIMS

[Claim(s)]

[Claim 1] The roll which carries out continuation transit of the base material, the nozzle which applies a coating on said base material, and said nozzle are equipped with an intermittent means to supply a coating intermittently. Said intermittent means Said coating of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle at the same time it intercepts the flow of said coating to said nozzle and leads in addition to said nozzle at the time of a spreading halt. The intermittent coater constituted so that said coating attracted in said predetermined location while opening the flow of said coating to said nozzle might be returned to said interior of a nozzle at the time of resumption of spreading.

[Claim 2] The roll which carries out continuation transit of the base material, the nozzle which applies a coating on said base material, and said nozzle are equipped with an intermittent means to supply a coating intermittently. Said intermittent means Said coating of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle at the same time it intercepts the flow of said coating to said nozzle and leads in addition to said nozzle at the time of a spreading halt. The intermittent coater made into $1 \leq 3\text{mm}$ of $0.1 \text{ mm} \leq L$ when it constituted at the time of resumption of spreading so that said coating attracted in said predetermined location may be returned to said interior of a nozzle and base material transit lay length of the downstream lip of said nozzle was set to $L1$ at it while opening the flow of said coating to said nozzle.

[Claim 3] The roll which carries out continuation transit of the base material, the nozzle which applies a coating on said base material, and said nozzle are equipped with an intermittent means to supply a coating intermittently. Said intermittent means The head which slides on the inside of housing which has the input and the tap hole of said coating, or said nozzle constitutes. Said head It has the supply way which leads the flow of said coating to said interior of a nozzle, and the return way which draws the flow of said coating except said nozzle. The line which connects the inlet port and outlet of said return way, and the migration direction of said head are the physical relationship of torsion. Said inlet port and input of said coating are arranged on a straight line parallel to the migration direction of said head. And at the time of a spreading halt At the same time it draws said coating in the suction section formed in said interior side of a nozzle by migration of said head The inlet port of said supply way is blockaded by the sliding surface of said housing or said nozzle, and the input and the tap hole of said coating are connected by said return way. At the time of resumption of spreading at the same time it returns said coating of said suction section by migration of said head -- the inlet port of said supply way -- said input and ***** -- the intermittent coater constituted like.

[Claim 4] The roll which carries out continuation transit of the base material, the nozzle which applies a coating on said base material, and said nozzle are equipped with an intermittent means to supply a coating intermittently. Said intermittent means Said coating of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle at the same time it intercepts the flow of said coating to said nozzle and leads in addition to said nozzle at the time of a spreading halt. The intermittent coater which constituted at the time of resumption of spreading so that said coating attracted in said predetermined location might be returned to said interior of a nozzle while opening the flow of said coating to said nozzle, and projected the lip of the upstream of said nozzle to said base material side in 5-1000 micrometers to the downstream lip.

[Claim 5] The roll which carries out continuation transit of the base material, the nozzle which applies a coating

on said base material, and said nozzle are equipped with an intermittent means to supply a coating intermittently. Said intermittent means Said coating of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle at the same time it intercepts the flow of said coating to said nozzle and leads in addition to said nozzle at the time of a spreading halt. The intermittent coater which constituted at the time of resumption of spreading so that said coating attracted in said predetermined location might be returned to said interior of a nozzle while opening the flow of said coating to said nozzle, and constituted the point of the downstream lip of said nozzle from a Sharp edge.

[Claim 6] The head which slides on the inside of housing which has the input and the tap hole of a coating, or a nozzle constitutes an intermittent means. Said head It has the supply way which leads the flow of said coating to said interior of a nozzle, and the return way which draws the flow of said coating except said nozzle. At the time of a spreading halt At the same time it draws said coating in the suction section formed in said interior side of a nozzle of migration of said head The inlet port of said supply way is blockaded by the sliding surface of said housing or said nozzle, and the input and the tap hole of said coating are connected by said return way. At the time of resumption of spreading The intermittent coater according to claim 1, 2, 4, or 5 constituted so that the inlet port of said supply way might be connected with said input while returning said coating of said suction section by migration of said head.

[Claim 7] The amount of the coating attracted by making a predetermined location into the suction section formed of migration of the head which constitutes an intermittent means is an intermittent coater given in any 1 term of claims 1-5 made into the amount equivalent to the volume of the suction section formed of migration of the head which constitutes an intermittent means.

[Claim 8] The amount of the coating attracted is an intermittent coater given in any 1 term of claims 1-5 constituted so that it might be equivalent to the volume of the suction section formed of migration of the head which constitutes an intermittent means and the end face by the side of the nozzle of said head and the end side of said nozzle might turn into the same field at the time of spreading.

[Claim 9] A nozzle is an intermittent coater given in any 1 term of claims 1-5 which prepared in the roll which supports a base material, and the location which counters, and set the diameter of a roll to 50mm or more.

[Claim 10] The slit gap of the slit of a nozzle is the intermittent coater according to claim 2, 4, or 5 set to 0.1mm or more and 2mm or less.

[Claim 11] The lip side of the upstream established in the nozzle is the intermittent coater according to claim 2, 4, or 5 made into the flat surface.

[Claim 12] The lip side of the downstream established in the nozzle is the intermittent coater according to claim 1, 2, or 4 made into the flat surface.

[Claim 13] The lip length L1 of the downstream which prepared in the nozzle is the intermittent coater according to claim 2 made into $1 \leq 2\text{mm}$ of $0.1 \text{ mm} \leq L$.

[Claim 14] The gap at the base material supported by the roll and the tip of a nozzle is the intermittent coater according to claim 2 set to 2mm or less.

[Claim 15] The movement magnitude of a head is the intermittent coater according to claim 3 set to 0.1mm or more and 50mm or less.

[Claim 16] It has the spreading process and spreading halt process which apply the coating which supplied the coating to the nozzle with an intermittent means to supply intermittently on the base material which carries out continuation transit. A spreading halt process At the same time it intercepts the flow of said coating to said nozzle and leads in addition to said nozzle Said coating of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle. A spreading process Said coating attracted in said predetermined location while opening the flow of said coating to said nozzle is returned to said interior of a nozzle. The amount of said said coating attracted is the intermittent method of application which carries out to 3 or more [0.1mm / per slit width of 10mm of said nozzle], and 3 or less [500mm], and carries out spreading formation of said coating intermittently on said base material.

[Claim 17] It has the spreading process and spreading halt process which apply the coating which supplied the coating to the nozzle with an intermittent means to supply intermittently on the base material which carries out continuation transit. A spreading halt process Spray air between the point of said nozzle, and said base material, and the flow of said coating to said nozzle is intercepted further. Said coating of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle at the same time it leads in addition to said nozzle. And a spreading process The intermittent method of application which

returns said coating attracted in said predetermined location to said interior of a nozzle at the same time it opens the flow of said coating to said nozzle, and carries out spreading formation of said coating intermittently on said base material.

[Claim 18] It has the spreading process and spreading halt process which apply the coating which supplied the coating to the nozzle with an intermittent means to supply intermittently on the base material which carries out continuation transit. A spreading halt process Said coating of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle at the same time it intercepts the flow of said coating to said nozzle and leads in addition to said nozzle. The pressure inside said nozzle [in / a spreading process returns said coating attracted in said predetermined location to said interior of a nozzle at the same time it opens the flow of said coating to said nozzle, and / a spreading process], or the pressure in piping in front of said nozzle, The intermittent method of application which makes equivalent the pressure of the flow of said coating led in addition to said nozzle in a spreading halt process, and carries out spreading formation of said coating intermittently on said base material.

[Claim 19] It has the spreading process and spreading halt process which apply the coating which supplied the coating to the nozzle with an intermittent means to supply intermittently on the base material which carries out continuation transit. A spreading halt process Said coating of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle at the same time it intercepts the flow of said coating to said nozzle and leads in addition to said nozzle. When it returns said coating attracted in said predetermined location to said interior of a nozzle while the spreading process opened the flow of said coating to said nozzle, and transit lay length of the base material of the downstream lip of said nozzle is set to L_1 , It is the intermittent method of application which is $1 \leq 3\text{mm}$ of $0.1 \text{ mm} \leq L$, makes the amount of said said coating attracted 3 or more [0.1mm / per slit width of 10mm of said nozzle], and 3 or less [500mm], and carries out spreading formation of said coating intermittently on said base material.

[Claim 20] The amount of the coating attracted is the intermittent method of application given in any 1 term of claims 16-19 equivalent to the volume of the suction section formed of migration of the head which constitutes an intermittent means.

[Claim 21] The intermittent method of application given in any 1 term of claims 16-19 which control the flow of [the flow of the coating led in addition to the nozzle].

[Claim 22] It has the spreading process and spreading halt process which are applied on the charge collector which carries out continuation transit of the active material paste supplied to the nozzle with the intermittent means. A spreading halt process At the same time it intercepts the flow of said active material paste to said nozzle and leads in addition to said nozzle Said active material paste of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle. A spreading process The manufacture approach of the cell electrode which returns said active material paste attracted in said predetermined location to said interior of a nozzle at the same time it opens the flow of said active material paste to said nozzle, and carries out spreading formation of said active material paste intermittently on said charge collector.

[Claim 23] The nonaqueous electrolyte cell using the cell electrode created by the manufacture approach of a cell electrode according to claim 22.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the nonaqueous electrolyte cell using the cell electrode created to the base material which carries out continuation transit, or the charge collector by the intermittent coater which carries out spreading formation of a coating or the active material paste intermittently, the intermittent method of application and the manufacture approach of a cell electrode, and the manufacture approach of a cell electrode.

[0002]

[Description of the Prior Art] As equipment which applies adhesives to the base material which carries out continuation transit intermittently, JP,62-266157,A is well-known. When apply hot melt and not applying it to the base material which supplies a nozzle and carries out continuation transit at the time of spreading, supply of the hot melt to a nozzle is stopped. Intermittent spreading is performed on a base material by repeating this actuation.

[0003] Moreover, development of the cell of a high energy consistency is demanded as those power sources in recent years with small [of various kinds of electronic equipment, such as VTR and communication equipment,], and lightweight-izing.

[0004] If it results in research of the lithium secondary battery with which there was a nonaqueous electrolyte cell as such a cell, and lithium content multiple oxides, such as a cobalt acid lithium, were used for the positive electrode, and it used the carbon material etc. for the negative electrode especially, and development, it is [current and] just going to be carried out actively.

[0005] However, compared with the cell of a water-solution system, the electrical conductivity of nonaqueous electrolyte is low and this kind of cell has a bad discharge rate property in order to use nonaqueous electrolyte. Therefore, it is necessary to make thin thickness of the electrode layer formed in the conductive base material which is a charge collector, and to raise current collection nature. Furthermore, the separator was made to be mutually placed between the conditions of having enlarged reaction area by having used the forward negative electrode as the sheet-like plate, and having made distance between plates small, the group-of-electrode configuration called spiral structure which wound the whole spirally was adopted, the active material fill was raised, and the discharge capacity of a cell is secured. At this time, the shape of surface type of a plate affects that current collection nature greatly. And especially a discharge property is greatly influenced by whether the current collection effectiveness of a plate is acquired by homogeneity.

[0006] As the manufacture approach of the conventional cell electrode, the method using the doctor blade shown in JP,1-184069,A, JP,1-194265,A, JP,4-242071,A, etc. was proposed. It becomes possible to form a sheet-like plate by forming a doctor blade with a predetermined gap to a charge collector according to this approach, and pulling out the active material coating stored in the before [a doctor blade] side in the shape of a layer from the gap of a doctor blade and the charge collector it runs.

[0007] However, in order to apply storing an active material coating in a before [a doctor blade] side, it was difficult for a solvent to evaporate, and for coating concentration to change and to perform stable spreading during spreading.

[0008] Moreover, the manufacturing method applied on a charge collector using an extrusion-die pouring-in machine is also examined so that JP,7-65816,A and JP,7-94170,A may see. By controlling coverage by JP,7-65816,A and attaining stabilization of a coating, it became possible to make dispersion in a rate property small

by making manufacture fluctuation of discharge capacity small.

[0009]

[Problem(s) to be Solved by the Invention] However, in the conventional intermittent coater, when intermittent spreading of the two or more 50 cc/m coating was carried out at a base material, at the spreading start edge and termination, there was a case where a coating will be applied to a base material in the state of a cobwebbing in the slit width direction like drawing 15, and the spreading start edge 24 and termination 22 did not become straight line-like. Since there was much coverage and between a nozzle and base materials and the coating of the slit outlet section of a nozzle were drawn out by the base material, this phenomenon is considered. In order that there might furthermore be no return of a coating at the time of a spreading halt, the pressure in piping by the side of coating supply rose, and there was a problem from which the spreading start edge serves as impasto under the effect of the pressure at the time of resumption of spreading.

[0010] Moreover, by the manufacture approach of the conventional cell electrode, in order to apply an active material coating on a charge collector continuously, the exfoliation process for forming the lead section on a charge collector is needed. For example, the approach of carrying out exfoliation removal of the active material which should remove a blade-like object from both sides of an active material etc. [as shown in JP,2-98040,A, after applying an active material coating and drying], and forming the lead section is proposed.

[0011] However, in order that an excessive process will not only be included, but establishing the process which carries out exfoliation removal of the active material layer may give mechanical stress to an active material layer in exfoliation, an adhesive property deteriorates in the interface of the active material layer which remained, and a charge collector. Moreover, it occurs that the active material layer which exfoliated serves as fine fine particles, and adheres on a plate. When the cell was created using such an electrode plate, the active material layer fell out, the internal short circuit was carried out, super-power was not obtained, or while repeating charge and discharge, problems -- discharge capacity is no longer obtained -- had arisen.

[0012] Moreover, in JP,7-94170,A, an active material coating is made to breathe out from the extrusion-die pouring-in machine which has a slot, and the approach of forming the lead section in coincidence by applying preparing at least one uncoated portion in the transit direction on a charge collector is proposed. According to this method, it becomes possible to form carrying out coating of the uncoated portion for forming the lead section, and the process which carries out exfoliation removal of the active material layer after spreading desiccation becomes unnecessary.

[0013] However, by this approach, since the direction which forms an uncoated portion is formed to the transit direction, in creating the wound sheet-like electrode, it will be necessary to carry out a slit to predetermined magnitude crosswise, and cannot necessarily say it as the efficient manufacture approach in a mass production mechanically.

[0014] This invention makes linear the spreading start edge and termination which carried out spreading formation intermittently on the base material, and sets it as the 1st purpose to offer the intermittent coater and approach of preventing the impasto of a spreading leader.

[0015] Moreover, while reducing a man day and improving productivity by forming an uncoated portion crosswise [of a charge collector] intermittently, it sets it as the 2nd purpose to obtain the cell which improved the adhesive property of the boundary section of an active material layer and a charge collector, and improved cell properties, such as discharge capacity, a rate property, and a cycle property.

[0016]

[Means for Solving the Problem] The coating supplied from intermittent equipment in the intermittent coater of this invention on the base material which carries out continuation transit in order to attain the 1st purpose is applied by the nozzle. An intermittent means Said coating of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle at the same time it intercepts the flow of said coating to said nozzle and leads in addition to said nozzle at the time of a spreading halt. At the time of resumption of spreading, it constitutes so that said coating attracted in said predetermined location may be returned to said interior of a nozzle, at the same time it opens the flow of said coating to said nozzle.

[0017] Thereby, while suspending coating supply for a nozzle at the time of a spreading halt, the coating of the slit outlet section of between a nozzle and base materials and a nozzle can be compulsorily drawn in the interior of a nozzle, and also when there is much coverage, an edge can be made linear always [spreading]. Furthermore, since the coating flows to places other than a nozzle by the return way, the pressure of a coating

supply means does not increase and the pressure can be made equivalent to the usual pressure at the time of resumption of spreading, the impasto at the time of resumption of spreading can be controlled.

[0018] It has the spreading process and spreading halt process which apply the coating supplied to the nozzle with an intermittent means to supply a coating intermittently, in the intermittent method of application of this invention on the base material which carries out continuation transit. At the same time a spreading halt process intercepts the flow of said coating to said nozzle and it leads in addition to said nozzle Said coating of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle. A spreading process Said coating attracted in said predetermined location while opening the flow of said coating to said nozzle is returned to said interior of a nozzle. The amount of said said coating attracted is made into 3 or more [0.1mm / per slit width of 10mm of said nozzle], and 3 or less [500mm], and carries out spreading formation of said coating intermittently on said base material.

[0019] The coating of the outlet section of the slit of between a nozzle and base materials and a nozzle can be certainly attracted inside a nozzle at the time of a spreading halt by making or more [0.1mm / per slit width of 10mm] into three the amount of the coating which this draws in the interior of a nozzle compulsorily at the time of a spreading halt. When returning to a nozzle the coating attracted in the predetermined location inside a nozzle at the time of resumption of spreading by furthermore making said amount or less [500mm] into three, while extruding the inside of a slit toward an outlet, it can control involving in air into a coating. Consequently, also when there is much coverage, an edge can be made linear always [spreading].

[0020] In the manufacture approach of the cell electrode of this invention, in order to attain the 2nd purpose It has the spreading process and spreading halt process which are applied on the charge collector which carries out continuation transit of the active material paste supplied to the nozzle with the intermittent means. A spreading halt process At the same time it intercepts the flow of said active material paste to said nozzle and leads in addition to said nozzle Said active material paste of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle. A spreading process Said active material paste attracted in said predetermined location is returned to said interior of a nozzle at the same time it opens the flow of said active material paste to said nozzle, and spreading formation of said active material paste is intermittently carried out on said charge collector.

[0021] Thereby, by forming an uncoated portion crosswise [of a charge collector] intermittently, while reducing a man day and improving productivity, the adhesive property of the boundary section of an active material layer and a charge collector can be improved, and the cell which improved cell properties, such as discharge capacity, a rate property, and a cycle property, can be obtained.

[0022] In the nonaqueous electrolyte cell of this invention, the cell electrode created by the manufacture approach of the above-mentioned cell electrode is used.

[0023] Thereby, the cell which improved cell properties, such as discharge capacity, a rate property, and a cycle property, can be obtained.

[0024]

[Embodiment of the Invention] The roll invention of this invention according to claim 1 carries out [roll] continuation transit of the base material, The nozzle which applies a coating on said base material, and said nozzle are equipped with an intermittent means to supply a coating intermittently. Said intermittent means Said coating of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle at the same time it intercepts the flow of said coating to said nozzle and leads in addition to said nozzle at the time of a spreading halt. It constitutes so that said coating attracted in said predetermined location while opening the flow of said coating to said nozzle may be returned to said interior of a nozzle at the time of resumption of spreading. While suspending coating supply for a nozzle at the time of a spreading halt, the coating of the slit outlet section of between a nozzle and base materials and a nozzle can be compulsorily drawn in the interior of a nozzle. Consequently, also when there is much coverage, an edge can be made linear always [spreading]. Since the coating furthermore flows to places other than a nozzle by the return way, the pressure of a coating supply means does not increase. Therefore, since the pressure is made to a usual pressure and a usual EQC in coating supply for a nozzle also in the time of resumption of spreading, the impasto at the time of resumption of spreading can be controlled.

[0025] Invention according to claim 2 equips the roll which carries out continuation transit of the base material, the nozzle which applies a coating on said base material, and said nozzle with an intermittent means to supply a

coating intermittently. Said intermittent means Said coating of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle at the same time it intercepts the flow of said coating to said nozzle and leads in addition to said nozzle at the time of a spreading halt. When it constitutes at the time of resumption of spreading so that said coating attracted in said predetermined location may be returned to said interior of a nozzle while opening the flow of said coating to said nozzle, and base material transit lay length of the downstream lip of said nozzle is set to L_1 , Since it considers as $1 \leq 3\text{mm}$ of $0.1\text{mm} \leq L$ and downstream lip length is made into the short range of 0.1 to 3mm, the amount of the coating which exists between a lip point and a base material can be lessened. Therefore, since there are few amounts of the coating which must be drawn in the interior of a nozzle at the time of a spreading halt, the coating which certainly exists between a nozzle and a base material can be drawn in the interior of a nozzle. Consequently, also when there is much coverage, an edge can be made linear always [spreading].

[0026] Invention according to claim 3 equips the roll which carries out continuation transit of the base material, the nozzle which applies a coating on said base material, and said nozzle with an intermittent means to supply a coating intermittently. Said intermittent means The head which slides on the inside of housing which has the input and the tap hole of said coating, or said nozzle constitutes. Said head It has the supply way which leads the flow of said coating to said interior of a nozzle, and the return way which draws the flow of said coating except said nozzle. The line which connects the inlet port and outlet of said return way, and the migration direction of said head are the physical relationship of torsion. Said inlet port and input of said coating are arranged on a straight line parallel to the migration direction of said head. And at the time of a spreading halt At the same time it draws said coating in the suction section formed in said interior side of a nozzle by migration of said head The inlet port of said supply way is blockaded by the sliding surface of said housing or said nozzle, and the input and the tap hole of said coating are connected by said return way. At the time of resumption of spreading At the same time it returns said coating of said suction section by migration of said head the inlet port of said supply way -- said input and ***** -- it constitutes like, and since the line and the migration direction of a head to which the inlet port and outlet of a return way are connected are made into the physical relationship of torsion, movement magnitude of a head can be made small. The inlet port of a return way and the input of the coating of housing are because it is arranged on the straight line parallel to the migration direction of a head, so the movement magnitude of a head can be determined at spacing of input and an inlet port. Therefore, it is small in the movement magnitude of the head when drawing a coating in the interior of a nozzle by migration of a head at the time of a spreading halt, namely, transit time of a head can be shortened. Consequently, since responsibility of the equipment in intermittent coating can be made quick, also when there is much coverage, an edge can be made linear always [spreading].

[0027] Invention according to claim 4 equips the roll which carries out continuation transit of the base material, the nozzle which applies a coating on said base material, and said nozzle with an intermittent means to supply a coating intermittently. Said intermittent means Said coating of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle at the same time it intercepts the flow of said coating to said nozzle and leads in addition to said nozzle at the time of a spreading halt. It constitutes so that said coating attracted in said predetermined location while opening the flow of said coating to said nozzle may be returned to said interior of a nozzle at the time of resumption of spreading. The lip of the upstream of said nozzle is projected to said base material side in 5-1000 micrometers to a downstream lip. Since the lip of the upstream has projected to the base material side to the downstream lip and can make small the clearance between an upstream lip and a base material, the amount of the coating in coating **** formed in this clearance can be lessened. Therefore, since there are few amounts of the coating which must be drawn in the interior of a nozzle at the time of intermittent coating, the coating which certainly exists between a nozzle and a base material can be drawn in the interior of a nozzle. Consequently, also when there is much coverage, an edge can be made linear always [spreading].

[0028] The roll which carries out continuation transit of the base material according to invention according to claim 5, and the nozzle which applies a coating on said base material, Said nozzle is equipped with an intermittent means to supply a coating intermittently. Said intermittent means Said coating of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle at the same time it intercepts the flow of said coating to said nozzle and leads in addition to said nozzle at the time of a spreading halt. It constitutes so that said coating attracted in said predetermined location while

opening the flow of said coating to said nozzle may be returned to said interior of a nozzle at the time of resumption of spreading. Since the point of the downstream lip of said nozzle is constituted from a Sharp edge and the tip of a downstream lip is used as the Sharp edge, the amount of the coating which exists between a lip point and a base material can be lessened extremely. Therefore, since there are few amounts of the coating which must be drawn in the interior of a nozzle at the time of a spreading halt, the coating which certainly exists between a nozzle and a base material can be drawn in the interior of a nozzle. Consequently, also when there is much coverage, an edge can be made linear always [spreading].

[0029] Invention according to claim 6 is set to invention according to claim 1, 2, 4, or 5. An intermittent means The head which slides on the inside of housing which has the input and the tap hole of a coating, or a nozzle constitutes. Said head It has the supply way which leads the flow of said coating to said interior of a nozzle, and the return way which draws the flow of said coating except said nozzle. At the time of a spreading halt At the same time it draws said coating in the suction section formed in said interior side of a nozzle of migration of said head The inlet port of said supply way is blockaded by the sliding surface of said housing or said nozzle, and the input and the tap hole of said coating are connected by said return way. At the time of resumption of spreading It constitutes so that the inlet port of said supply way may be connected with said input, at the same time it returns said coating of said suction section by migration of said head. By migration of one head Three actuation of supply of the coating to a nozzle, a halt and supply of the coating to a nozzle, suction of the coating a return and inside a nozzle, and return can be ensured [that it is simultaneous and].

[0030] Invention according to claim 7 is set to invention according to claim 1 to 5. A predetermined location Consider as the suction section formed of migration of the head which constitutes an intermittent means, and the amount of the coating attracted Since it can consider as the amount equivalent to the volume of the suction section formed of migration of the head which constitutes an intermittent means, and the location which attracts a coating certainly by migration of a head can be formed and the volume of the suction section is decided mechanically, reproducible intermittent spreading can be performed.

[0031] The amount of the coating by which invention according to claim 8 is attracted in invention according to claim 1 to 5 Are equivalent to the volume of the suction section formed of migration of the head which constitutes an intermittent means. And it constitutes so that the end face by the side of the nozzle of said head and the end side of said nozzle may turn into the same field at the time of spreading, by considering as the same flat surface, in order that there may be no unnecessary irregularity, a slit side is not covered with a coating, but generating of a coating muscle can be controlled with the lump of a coating etc. during spreading.

[0032] In invention according to claim 1 to 5, a nozzle can be prepared in the roll which supports a base material, and the location which counters, and can set the diameter of a roll to 50mm or more, when intermittent spreading is carried out, a base material and a nozzle can contact, and invention according to claim 9 can prevent that a base material is cut.

[0033] When it sets the slit gap of the slit of a nozzle to 0.1mm or more and 2mm or less, a slit gap is smaller than 0.1mm and a coating is attracted, invention according to claim 10 has a too small slit gap, and resistance of the flowing coating becomes large and it becomes impossible to attract the inside of a slit in invention according to claim 2, 4, or 5. Moreover, if a slit gap is longer than 2mm, there are too many amounts of the coating of the outlet section of a slit, and it is impossible to make spreading termination linear.

[0034] It becomes it is possible to make into a flat surface the lip side of the upstream which prepared invention according to claim 11 in the nozzle in invention according to claim 2, 4, or 5, and to set flatness of a lip point and precision of the degree of **** to 10 micrometers or less, and possible for this reason to apply thickness to homogeneity crosswise [spreading].

[0035] It becomes it is possible to make into a flat surface the lip side of the downstream which prepared invention according to claim 12 in the nozzle in invention according to claim 1, 2, or 4, and to set flatness of a lip point and precision of the degree of **** to 10 micrometers or less, and possible for this reason to apply thickness to homogeneity crosswise [spreading].

[0036] The lip length L1 of the downstream which prepared invention according to claim 13 in the nozzle in invention according to claim 2 can consider as $1 \leq 2\text{mm}$ of $0.1 \text{ mm} \leq L$, can lessen the amount of the coating of the clearance between nozzle trawls, and can do intermittent spreading with a sufficient piece.

[0037] If the gap at the base material with which invention according to claim 14 was supported by the roll in invention according to claim 2, and the tip of a nozzle is set to 2mm or less and its gap is longer than 2mm

Although they are unable for there to be too many amounts of the coating of the outlet section of a slit, and to make spreading termination linear, spreading termination can be made linear by setting a gap to 2mm or less. [0038] Invention according to claim 15 is set to invention according to claim 3. The movement magnitude of a head 0.1mm or more, Although cannot attract a coating inside a nozzle certainly when smaller than this range, but, intermittent spreading becomes impossible, and the transit time of a head is too long and stops being able to make spreading termination linear when larger than this range, [50mm or less] By being referred to as 0.1mm or more and 50mm or less, the movement magnitude of a head can perform intermittent spreading and can make spreading termination linear.

[0039] Invention according to claim 16 has the spreading process and spreading halt process which apply the coating which supplied the coating to the nozzle with an intermittent means to supply intermittently on the base material which carries out continuation transit. A spreading halt process At the same time it intercepts the flow of said coating to said nozzle and leads in addition to said nozzle Said coating of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle. A spreading process Said coating attracted in said predetermined location while opening the flow of said coating to said nozzle is returned to said interior of a nozzle. The amount of said said coating attracted Per slit width of 10mm of said nozzle, While carrying out to 3 or more [0.1mm] and 3 or less [500mm], carrying out spreading formation of said coating intermittently on said base material and suspending coating supply for a nozzle at the time of a spreading halt, the coating of the slit outlet section of between a nozzle and base materials and a nozzle can be compulsorily drawn in the interior of a nozzle. By making the amount of this coating to draw or more [0.1mm / per slit width of 10mm] into three, the coating of the slit outlet section of between a nozzle and base materials and a nozzle can be certainly attracted inside a nozzle at the time of a spreading halt. When returning to a nozzle the coating attracted in the predetermined location inside a nozzle at the time of resumption of spreading by furthermore making said amount or less [500mm] into three, while extruding the inside of a slit toward an outlet, it can control involving in air into a coating. Consequently, also when there is much coverage, an edge can be made linear always [spreading].

[0040] Invention according to claim 17 has the spreading process and spreading halt process which apply the coating which supplied the coating to the nozzle with an intermittent means to supply intermittently on the base material which carries out continuation transit. A spreading halt process Spray air between the point of said nozzle, and said base material, and the flow of said coating to said nozzle is intercepted further. Said coating of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle at the same time it leads in addition to said nozzle. And a spreading process Said coating attracted in said predetermined location while opening the flow of said coating to said nozzle is returned to said interior of a nozzle. In order to carry out spreading formation of said coating intermittently on said base material and to spray air between a nozzle point and a base material at the time of a spreading halt When the coating of the slit outlet section of between a nozzle and base materials and a nozzle is compulsorily drawn in the interior of a nozzle at the same time it suspends coating supply for a nozzle, the coating which remains slightly can be blown away. Consequently, also when there is much coverage, an edge can be made linear always [spreading].

[0041] Invention according to claim 18 has the spreading process and spreading halt process which apply the coating which supplied the coating to the nozzle with an intermittent means to supply intermittently on the base material which carries out continuation transit. A spreading halt process Said coating of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle at the same time it intercepts the flow of said coating to said nozzle and leads in addition to said nozzle. The pressure inside said nozzle [in / a spreading process returns said coating attracted in said predetermined location to said interior of a nozzle at the same time it opens the flow of said coating to said nozzle, and / a spreading process], or the pressure in piping in front of said nozzle, The pressure of the flow of said coating led in addition to said nozzle in a spreading halt process is made equivalent. While carrying out spreading formation of said coating intermittently on said base material and suspending coating supply for a nozzle at the time of a spreading halt, the coating of the slit outlet section of between a nozzle and base materials and a nozzle can be compulsorily drawn in the interior of a nozzle. Consequently, also when there is much coverage, an edge can be made linear always [spreading]. Furthermore, since the coating flows to places other than a nozzle by the return way and the pressure of a coating supply means does not increase, the impasto of the

spreading start edge can be prevented. Furthermore, since the pressure of the coating by which a return is carried out is made equivalent to the pressure at the time of spreading, the pressure drop at the time of a return is controlled at the time of resumption of spreading, and it can control that the spreading start edge serves as thin **.

[0042] Invention according to claim 19 has the spreading process and spreading halt process which apply the coating which supplied the coating to the nozzle with an intermittent means to supply intermittently on the base material which carries out continuation transit. A spreading halt process Said coating of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle at the same time it intercepts the flow of said coating to said nozzle and leads in addition to said nozzle. When it returns said coating attracted in said predetermined location to said interior of a nozzle while the spreading process opened the flow of said coating to said nozzle, and transit lay length of the base material of the downstream lip of said nozzle is set to L , It is $1 \leq 3\text{mm}$ of $0.1 \text{ mm} \leq L$. The amount of said said coating attracted Per slit width of 10mm of said nozzle, While carrying out to 3 or more [0.1mm] and 3 or less [500mm], carrying out spreading formation of said coating intermittently on said base material and suspending coating supply for a nozzle at the time of a spreading halt, the coating of the slit outlet section of between a nozzle and base materials and a nozzle can be compulsorily drawn in the interior of a nozzle. Consequently, also when there is much coverage, an edge can be made linear always [spreading]. Furthermore, since the coating flows to places other than a nozzle by the return way, the pressure of a coating supply means does not increase. Therefore, since the pressure is made to a usual pressure and a usual EQC in coating supply for a nozzle also in the time of resumption of spreading, the impasto at the time of resumption of spreading can be controlled.

[0043] Since downstream lip length is furthermore made into the short range of 0.1 to 3mm, the amount of the coating which exists between a lip point and a base material can be lessened. Therefore, since there are few amounts of the coating which must be drawn in the interior of a nozzle at the time of a spreading halt, the coating which certainly exists between a nozzle and a base material can be drawn in the interior of a nozzle. Consequently, also when there is much coverage, an edge can be made linear always [spreading]. The coating of the slit outlet section of between a nozzle and base materials and a nozzle can be certainly attracted inside a nozzle at the time of a spreading halt by making the amount of the coating to attract or more [0.1mm / per slit width of 10mm] into three further again. When returning to a nozzle the coating attracted in the predetermined location inside a nozzle at the time of resumption of spreading by furthermore making said amount or less [500mm] into three, it can control involving in air, while flowing a slit. The above result, also when there is much coverage, an edge can be made linear always [spreading].

[0044] Since it is equivalent to the volume of the suction section formed of migration of the head which constitutes an intermittent means, and the location which attracts a coating certainly by migration of a head can be formed and the volume of the suction section is decided mechanically, the amount of the coating by which invention according to claim 20 is attracted in invention according to claim 16 to 19 can perform reproducible intermittent spreading.

[0045] In invention according to claim 16 to 19, invention according to claim 21 can make equivalent the return pressure at the time of an intermission, and the nozzle pressure at the time of spreading by controlling the flow of [the flow of the coating led in addition to the nozzle], and controlling the flow, and, thereby, can carry out spreading formation by predetermined thickness immediately at the time of resumption of spreading.

[0046] Invention according to claim 22 has the spreading process and spreading halt process which are applied on the charge collector which carries out continuation transit of the active material paste supplied to the nozzle with the intermittent means. A spreading halt process At the same time it intercepts the flow of said active material paste to said nozzle and leads in addition to said nozzle Said active material paste of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle. A spreading process Said active material paste attracted in said predetermined location while opening the flow of said active material paste to said nozzle is returned to said interior of a nozzle. Spreading formation of said active material paste is intermittently carried out on said charge collector, the uncoated portion for making the lead section form crosswise [of a charge collector] can be prepared, making it run a charge collector, and it becomes possible to skip an exfoliation process. Moreover, since there is no mechanical stress when stripping off an active material layer by intermittent coating as compared with the plate which passed

through the conventional exfoliation process, the cell discharge capacity, the rate property, and whose cycle property the adhesive property of an active material improved in the interface of an active material layer and a charge collector, and improved can be created.

[0047] Invention according to claim 23 can obtain the cell discharge capacity, the rate property, and whose cycle property improved using the cell electrode created by the manufacture approach of a cell electrode according to claim 22.

[0048] Hereafter, the gestalt of operation of this invention is explained, referring to a drawing.

(Gestalt 1 of operation) The gestalt 1 of operation is related with the intermittent coater of invention according to claim 1. The condition that drawing 1 has applied the coating 11 to a base material 12, and drawing 2 show the condition of having suspended spreading.

[0049] As shown in drawing, a coating 11 is supplied to a nozzle 1 from the head 2 which constitutes an intermittent means, and it applies a coating on the base material 12 which is supported by the roll 13 and carries out continuation transit. The supply way 3 which leads the flow of a coating 11 to the nozzle 1 interior, and the return way 4 which draws the flow of a coating 11 except nozzle 1 are established in a head 2, this head is prepared free [migration] in the housing 5 which fixed for the nozzle 1, and it enables it to move up and down by the head mechanical component 10. In addition, a coating 11 contains coating liquid, a paste, ink, and a slurry.

[0050] The manifold 6 which was open for free passage on the supply way 3 of a head 2 was formed, it was open for free passage to this manifold 6, and the slit 7 is formed in the nozzle 1. A charging line 8 is connected with the input 18 established in housing 5, and supplies a coating 11, and the return piping 9 is connected with the tap hole 19 established in housing 5, and is made to carry out the return of the coating 11. In addition, as for a head 2, a cross-section configuration may attach a baffle pin (not shown) etc. by the square shape, the polygon form, or the round shape for niting.

[0051] the above -- a configuration -- setting -- actuation -- explaining -- if -- spreading -- the time -- setting -- a pump (not shown) -- etc. -- a coating -- 11 -- a charging line -- eight -- a passage -- housing -- five -- having prepared -- input -- 18 -- a passage -- a head -- two -- supply -- a way -- three -- flowing -- a nozzle -- one -- a manifold -- six -- flowing in -- further -- a slit -- seven -- from -- extruding -- having -- a roll -- 13 -- supporting -- having -- continuation -- transit -- carrying out -- ***** -- 12 -- a top -- applying -- having .

[0052] By the head mechanical component 10, as shown at drawing 2 at the time of a spreading halt, by moving a head 2 in the direction of arrow-head A, the suction section 25 can be formed and the coating 11 which exists between the point of a nozzle 1 and base materials 12 and in the outlet section of a slit 7 can be attracted inside a nozzle 1. Therefore, at the time of a spreading halt, spreading termination can be made linear. The amount of the coating 11 to attract is equivalent to the volume of the suction section 25 formed by migration of a head 2.

[0053] At this time, the inlet port of the supply way 3 is blockaded by the sliding surface of housing 5, and a coating 11 flows the return way 4 of a head 2 from the input 18 established in housing 5 through the charging line 8, and flows for the return piping 9. Therefore, also in the time of a spreading halt, the rise of the paint pressure force in a charging line 8 can be controlled. Therefore, when a head 2 is moved in the direction of arrow-head B at the time of resumption of spreading and supply of the coating to a nozzle 1 is started, the paint pressure force of a nozzle 1 is not raised. For this reason, the impasto of the spreading start edge can be controlled.

[0054] The biggest description of the gestalt of this operation only move a head 2 in the direction of arrow head A, the return of it be carry out at the same time it intercept supply of the coating 11 to a nozzle 1, and it be to have three functions, i.e., cutoff, in which the coating 11 which exist between the point of a nozzle 1 and base materials 12 and in the outlet section of a slit 7 further can be attract inside a nozzle 1, a return, and suction.

[0055] In the gestalt of this operation, it is desirable that the end face 26 and the slit side 27 by the side of the nozzle of a head 2 turn into the same flat surface at the time of spreading. By considering as the same flat surface, in order that there may be no unnecessary irregularity, the slit side 27 is not covered with a coating, but generating of a coating muscle can be controlled with the lump of a coating etc. during spreading.

[0056] Although the point configuration of a nozzle 1 is a flat surface in drawing 1, about the gestalt of this operation, you may not necessarily be a flat surface. For example, the shape of the curved configuration with radius of curvature and a polygon and the Sharp edge configuration are sufficient.

[0057] Moreover, the gap of the point of a nozzle 1 and the base material 12 supported by the roll 13 has 2

desirablemm or less. If larger than 2mm, the amount of the coating which exists in the clearance between the point of a nozzle 1 and a base material 12 will increase too much, it cannot draw in inside a nozzle 1 at the time of a spreading halt, and it will become difficult to make spreading termination linear.

[0058] According to the gestalt of this operation, intermittent spreading of the coating with a viscosity of 5poise which distributed carbon with a mean particle diameter of 5 micrometers was carried out as a base material 12 at the film with a thickness of 20 micrometers. After applying die length of 100mm to the transit direction of a base material 12, intermittent spreading which prepares the part which is not applied 10mm was repeated, and was performed. The travel speeds of a film are 20 m/min and coverage is 80 cc/m².

[0059] According to the gestalt of this operation, as shown in drawing 16, the spreading termination 22 and the spreading start edge 24 of the spreading section 23 which applied the coating 11 could be made linear, further, there is also no impasto in the spreading start edge 24 in a base material 12, and intermittent spreading of uniform thickness was completed in it in the film transit direction. On the other hand, as a result of the conventional example's performing same intermittent spreading, as shown in drawing 15, as for the spreading start edge 24, the spreading termination 22 and the spreading start edge 24 of the spreading section 23 are turbulence and a pan with impasto. The above result shows that the effectiveness of the gestalt of this operation is excellent.

[0060] (Gestalt 2 of operation) The gestalt 2 of operation is related with the intermittent coater of invention according to claim 2. About the gestalt of this operation, as shown in drawing 3, the biggest description is in the configuration of the lip point of a nozzle 1. When the field length of the down-stream lip 15 which established in the downstream the field length of the upper lip 14 which prepared in the upstream from the slit 7 from the slit 7 to L2 and the transit direction of a base material 12 is set to L1 to the transit direction of a base material 12, it considers as $1 \leq 3\text{mm}$ of $0.1 \text{ mm} \leq L$. It considers as $1 \leq 2\text{mm}$ of $0.1 \text{ mm} \leq L$ still more preferably. Although it does not limit especially concerning L2, it usually considers as the range of 0.2mm or more and 5mm or less. In addition, the installation hole 16 is for attaching the housing 5 shown in drawing 1. Other configurations are the same as the gestalt 1 of the above-mentioned implementation.

[0061] If actuation is explained in the above-mentioned configuration, as shown in drawing 1 and drawing 2, it will set like the gestalt 1 of the above-mentioned implementation at the time of spreading. The input 18 which the coating 11 passed along the charging line 8, and was established in housing 5 with the pump (not shown) etc. A passage, The supply way 3 of a head 2 is flowed, and it flows into the manifold 6 of a nozzle 1, extrudes from a slit 7 further, and is applied on the base material 12 which is supported by the roll 13 and carries out continuation transit. By moving a head 2 in the direction of arrow-head A at the time of a spreading halt, the suction section 25 can be formed and the coating 11 which exists between the down-stream lip 15 of a nozzle 1 and base materials 12 and in the outlet section of a slit 7 can be attracted inside a nozzle 1.

[0062] With the gestalt of this operation, since the field length L1 of the down-stream lip 15 is made into $1 \leq 2\text{mm}$ of $0.1 \text{ mm} \leq L$, there are few amounts of the coating 11 which exists in liquid pool **** 17, therefore there are few amounts which attract a coating 11 by migration of a head 2, the coating 11 which certainly exists between a nozzle 1 and a base material 12 can be drawn in the nozzle 1 interior. Consequently, also when there is much coverage, an edge can be made linear always [spreading].

[0063] Although surely the amount of the coating of liquid pool **** 17 decreases when the field length L1 of the down-stream lip 15 is smaller than 0.1mm, die length is too short, and a pressure is not applied to the clearance between the down-stream lip 15 and a base material 12, but the homogeneity of crosswise thickness is spoiled. Moreover, if L1 is longer than 3mm, as described above, there are too many amounts of the coating of liquid pool **** 17, and it is impossible to make spreading termination linear.

[0064] Moreover, since the viscosity of a coating stops further easily being able to attract the coating of liquid pool **** 17 inside a nozzle 1 1poise or more in being high, L1 has 2 desirablemm or less.

[0065] Moreover, the slit gap SG of a slit 7 is set to 0.1mm or more and 2mm or less. When the slit gap SG is smaller than 0.1mm and a coating is attracted, the slit gap SG is too small, and resistance of the flowing coating 11 becomes large and it becomes impossible to attract the inside of a slit 7. Moreover, if the slit gap SG is longer than 2mm, there are too many amounts of the coating of the outlet section of a slit 7, and it is impossible to make spreading termination linear.

[0066] On the other hand, the diameter of the roll 13 which supports a base material 12 is set to 50mm or more. Usually, it is the range of 400mm from the diameter of 150mm. When smaller than 50mm, the difference of a

part with the narrowest clearance between the down-stream lip 15 and a base material 12 and a large part becomes large too much due to the radius of curvature of a roll, and the amount of the coating of liquid pool **** 17 increases as a result. Consequently, spreading termination will be confused, without the ability attracting the coating 11 of liquid pool **** 17 to a nozzle 1 at the time of a spreading halt. The amount of the coating 11 to attract is equivalent to the volume of the suction section 25 formed by migration of a head 2.

[0067] It is moving a head 2 in the direction of arrow-head A at the time of a spreading halt, and the inlet port of the supply way 3 is blockaded by the sliding surface of housing 5, and a coating 11 passes along a charging line 8, flows the return way 4 of a head 2 from the input 18 established in housing 5, and flows for the return piping 9. Therefore, since the rise of the paint pressure force in a charging line 8 can be controlled also in the time of a spreading halt, when a head 2 is moved in the direction of arrow-head B at the time of resumption of spreading and supply of the coating to a nozzle 1 is started, the paint pressure force of a nozzle 1 is not raised. For this reason, the impasto of the spreading start edge can be controlled.

[0068] In addition, as for a head 2, a cross-section configuration may attach a baffle pin (not shown) etc. by the square shape, the polygon form, or the round shape for niting.

[0069] Another description of the gestalt of this operation only moves a head 2 in the direction of arrow head A, the return of it is carry out at the same time it intercepts supply of the coating to a nozzle 1, and it is to have three functions, cutoff and the return that the coating 11 which exists between the point of a nozzle 1 and base materials 12 and in the outlet section of a slit 7 further can be attract inside a nozzle 1, and suction.

[0070] In the gestalt of this operation, it is desirable that the end face 26 and the slit side 27 by the side of the nozzle 2 of a head 2 turn into the same flat surface at the time of spreading. By considering as the same flat surface, in order that there may be no unnecessary irregularity, the slit side 27 is not covered with a coating, but generating of a coating muscle can be controlled with the lump of a coating etc. during spreading. As the point configuration of a nozzle 1 is shown in drawing 1, the upper lip 14 and the down-stream lip 15 are flat surfaces. It is possible to set flatness of a lip point and precision of the degree of **** to 10 micrometers or less by considering as this configuration. For this reason, it became possible to apply thickness to homogeneity crosswise [spreading].

[0071] Moreover, the gap of the point of a nozzle 1 and the base material 12 supported by the roll 13 has 2 desirablenmm or less. If larger than 2mm, the amount of the coating which exists in the clearance between the point of a nozzle 1 and a base material 12 will increase too much, and it cannot draw in inside a nozzle 1 at the time of a spreading halt, and it becomes difficult to make spreading termination linear.

[0072] According to the gestalt of this operation, the field length L1 of the down-stream lip 15 did intermittent spreading of the coating with a viscosity of 5poise which distributed carbon with a mean particle diameter of 5 micrometers as a base material 12 at the film with a thickness of 20 micrometers using four nozzles which are 0.1mm, 2mm, 3mm, and 4mm. After applying die length of 100mm to the base material transit direction, intermittent spreading which prepares the part which is not applied 10mm was repeated, and was performed. The travel speeds of a film are 20 m/min and coverage is 80 cc/m².

[0073] According to the gestalt of this operation, with the nozzle whose L1 is 0.1 and 2 or 3mm, as shown in drawing 16, the spreading termination 22 and the spreading start edge 24 of the spreading section 23 which applied the coating 11 could be made linear, further, there is also no impasto in the spreading start edge 24 in a base material 12, and intermittent spreading of uniform thickness was completed in it in the film transit direction. On the other hand, as a result of L's1 performing same intermittent spreading by a nozzle and the conventional example 4mm or more, as shown in drawing 15, as for the spreading start edge 24, the spreading termination 22 and the spreading start edge 24 of the spreading section 23 are turbulence and a pan with impasto. The above result shows that the effectiveness of the gestalt of this operation is excellent.

[0074] (Gestalt 3 of operation) The gestalt 3 of operation is related with the intermittent coater of invention according to claim 3. As shown in drawing 6 and drawing 7, the line and the migration direction of a head 2 to which the inlet port 20 and outlet 21 of the return way 4 established in the head 2 are connected are the physical relationship of torsion, and an inlet port 20 and the input 18 established in the housing 5 of a coating are arranged on a straight line parallel to the migration direction of a head 2. Other configurations are the same as the gestalt 1 of the above-mentioned implementation.

[0075] Actuation is explained in the above-mentioned configuration. Drawing 4 shows the condition of having applied the coating 11 to a base material 12, and drawing 5 shows the condition of having suspended spreading.

[0076] the time of spreading -- setting -- a pump (not shown) etc. -- a coating 11 -- a charging line 8 -- a passage -- housing 5 -- having prepared -- input -- 18 -- a passage -- a head 2 -- the supply way 3 is flowed, and it flows into the manifold 6 of a nozzle 1, extrudes from a slit 7 further, and is applied on the base material 12 which is supported by the roll 13 and carries out continuation transit.

[0077] By moving a head 2 in the direction of arrow-head A at the time of a spreading halt, the suction section 25 can be formed and the coating which exists between the point of a nozzle 1 and base materials 12 and in the outlet section of a slit 7 can be attracted inside a nozzle 1. Therefore, at the time of a spreading halt, spreading termination can be made linear. The amount of the coating 11 to attract is equivalent to the volume of the suction section 25 formed by migration of a head 2. The inlet port of the supply way 3 is blockaded by the sliding surface of housing 5, and a coating 11 flows the return way 4 of a head 2 from the input 18 established in housing 5 through the charging line 8, and flows for the return piping 9.

[0078] In the gestalt of this operation, the line and the migration direction of a head 2 to which the inlet port 20 and outlet 21 of the return way 4 established in the head 2 be connected be the physical relationship of torsion, and the biggest description be arrange an inlet port 20 and the input 18 established in the housing 5 of a coating 11 on a straight line parallel to the migration direction of a head 2, as shown in drawing 6 and drawing 7. By considering as this configuration, movement magnitude of a head 2 can be made small.

[0079] Because, the movement magnitude of a head 2 is decided by stroke required in order to connect to the inlet port 20 of the return way 4 that to which the input 18 of housing 5 and the inlet port of the supply way 3 are connected at the time of spreading by migration of a head 2 at the time of a spreading halt. With the gestalt of this operation, the inlet port 20 of the return way 4 and the input 18 of the coating of housing are because it is arranged on the straight line parallel to the migration direction of a head 2, so spacing of the input 18 at the time of spreading and the inlet port 20 of the return way 4 can determine the movement magnitude of a head 2.

[0080] And since the line and the migration direction of a head 2 to which the inlet port 20 and outlet 21 of the return way 4 established in the head 2 are connected are made into the physical relationship of torsion, as for the required movement magnitude of a head 2, the location of the outlet 21 for carrying out the return of the coating 11 has the advantage which can be independently designed to arbitration.

[0081] As mentioned above, by making movement magnitude of a head 2 small, movement magnitude of the head 2 when drawing a coating 11 in the interior of a nozzle 1 by migration of a head 2 at the time of a halt can be made small, namely, transit time of a head 2 can be shortened. Consequently, since time amount of suction actuation of the coating 11 by the head 2 can be shortened, also when there is much coverage, the spreading termination 22 and the spreading start edge 24 of the spreading section 23 which applied the coating 11 to the base material 12 can be made linear.

[0082] In addition, the return way 4 is good also as a through hole, as are shown in drawing 7 (a), and it prepares by the groove on the peripheral surface of a head 2 or is shown in drawing 7 (b).

[0083] Movement magnitude of a head 2 is set to 0.1mm or more and 50mm or less. When smaller than this range, a coating 11 cannot be certainly attracted to the nozzle 1 interior, but intermittent spreading becomes impossible. When larger than this range, the transit time of a head 2 is too long, and stops moreover, being able to make spreading termination linear.

[0084] With the gestalt of this operation, since the return of the coating 11 can be carried out certainly and the rise of the paint pressure force in a charging line 8 can be controlled also in the time of a spreading halt, when a head 2 is moved in the direction of arrow-head B at the time of resumption of spreading and supply of the coating to a nozzle 1 is started, the paint pressure force of a nozzle 1 is not raised. For this reason, the impasto of the spreading start edge 24 can be controlled.

[0085] In addition, as for a head 2, a cross-section configuration may attach a baffle pin (not shown) etc. by the square shape, the polygon form, or the round shape for niting.

[0086] Another description of the gestalt of this operation only moves a head 2 in the direction of arrow-head A, the return of it is carry out at the same time it intercepts supply of the coating to a nozzle 1, and it is to have three functions, cutoff and the return that the coating which exists between the point of a nozzle 1 and base materials 12 and in the slit outlet section further can be attract inside a nozzle 1, and suction.

[0087] In the gestalt of this operation, it is desirable that the nozzle side edge side 26 and the slit side 27 of a head 2 turn into the same flat surface at the time of spreading. By considering as the same flat surface, in order that there may be no unnecessary irregularity, the slit side 27 is not covered with a coating, but generating of a

coating muscle can be controlled with the lump of a coating etc. during spreading.

[0088] Moreover, the slit gap SG of a slit 7 is set to 0.1mm or more and 2mm or less. When the slit gap SG is smaller than 0.1mm and a coating 11 is attracted, the slit gap SG is too small, and resistance of the flowing coating 11 becomes large and it becomes impossible to attract the inside of a slit 7. Moreover, if the slit gap SG is longer than 2mm, there are too many amounts of the coating 11 of the outlet section of a slit 7, and it is impossible to make spreading termination 22 linear.

[0089] Although the point configuration of a nozzle 1 is a flat surface in drawing 1, it may not necessarily be a flat surface about the gestalt of this operation. For example, the shape of the curved configuration with radius of curvature and a polygon and the Sharp edge configuration are sufficient.

[0090] Moreover, the gap of the point of a nozzle 1 and the base material 12 supported by the roll 13 has 2 desirablenmm or less. If larger than 2mm, the amount of the coating 11 which exists in the clearance between the point of a nozzle 1 and a base material 12 will increase too much, and it cannot draw in inside a nozzle 1 at the time of a spreading halt, and it becomes difficult to make spreading termination 22 linear.

[0091] According to the gestalt of this operation, intermittent spreading of the coating with a viscosity of 5poise which distributed carbon with a mean particle diameter of 5 micrometers was carried out as a base material at the film with a thickness of 20 micrometers. Movement magnitude of a head 2 was set to 10mm. After applying 100mm, intermittent spreading which prepares the part which is not applied 10mm was repeated, and was performed. The travel speeds of a film are 20 m/min and coverage is 80 cc/m².

[0092] According to the gestalt of this operation, as shown in drawing 16, the spreading termination 22 and the spreading start edge 24 of the spreading section 23 which applied the coating 11 could be made linear, further, there is also no impasto in the spreading start edge 24 in a base material 12, and intermittent spreading of uniform thickness was completed in it in the film transit direction. On the other hand, as a result of the conventional example's performing same intermittent spreading, as shown in drawing 15, as for the spreading start edge 24, the spreading termination 22 and the spreading start edge 24 of the spreading section 23 are turbulence and a pan with impasto. The above result shows that the effectiveness of the gestalt of this operation is excellent.

[0093] (Gestalt 4 of operation) The gestalt 4 of operation is related with the intermittent coater of invention according to claim 4. About the gestalt of this operation, as shown in drawing 8, the biggest description is in the configuration of the lip point of a nozzle 1. The upper lip 14 prepared in the upstream from the slit 7 to the transit direction of a base material 12 has projected from the slit 7 to the base material side to the down-stream lip 15 prepared in the downstream, and sets the amount d of ejection to 5 micrometers or more and 1000 micrometers or less.

[0094] Moreover, the field length of the upper lip 14 is made into $1 \leq 3\text{mm}$ of $0.1 \text{ mm} \leq L$ when the field length of L2 and the down-stream lip 15 is set to L1. It considers as $1 \leq 2\text{mm}$ of $0.1 \text{ mm} \leq L$ still more preferably. Although it does not limit especially concerning L2, it usually considers as the range of 0.2mm or more and 5mm or less. In addition, the installation hole 16 is for attaching the housing 5 shown in drawing 1. Other configurations are the same as the gestalt 1 of the above-mentioned implementation.

[0095] In the above-mentioned configuration, about actuation of intermittent spreading, since it is the same as the gestalten 1 or 2 of operation, it omits, and only effectiveness peculiar to the gestalt of this operation is explained.

[0096] By projecting the upper lip 14 to a base material 12 side, the clearance between the upper lip 14 and a base material 12 can be made small. Consequently, since the amount of the coating 11 which exists in that clearance at the time of spreading can be lessened, when attracting a coating 11 to the nozzle 1 interior at the time of a spreading halt, it can draw in certainly and the spreading termination 22 and the spreading start edge 24 of the spreading section 23 which applied the coating 11 to the base material 12 can be made linear.

[0097] Since there are many amounts on which a coating 11 collects [the amount d of ejection] in being smaller than 5 micrometers, the effectiveness of this invention is spoiled. Moreover, the amount of the coating 11 with which the clearance between the down-stream lip 15 and a base material 12 exists in this clearance by the amount d of ejection becoming large too much when larger than 1000 micrometers increases too much, at the time of a spreading halt, it becomes impossible to be unable to attract a coating inside a nozzle 1, and the spreading termination 22 and the spreading start edge 24 of the spreading section 23 will be confused.

[0098] Moreover, although surely the amount of the coating of liquid pool **** 17 decreases when the field

length L1 of the down-stream lip 15 is smaller than 0.1mm, die length is too short, and a pressure is not applied to the clearance between the down-stream lip 15 and a base material 12, but the homogeneity of crosswise thickness is spoiled. Moreover, if L1 is longer than 3mm, there are too many amounts of the coating of liquid pool **** 17, and it is impossible to make linear the spreading termination 22 and the spreading start edge 24 of the spreading section 23. Moreover, since the viscosity of a coating 11 stops further easily being able to attract the coating of liquid pool **** 17 inside a nozzle 1 1poise or more in being high, L1 has 2 desirablemm or less.

[0099] On the other hand, the diameter of the roll 13 which supports a base material 12 is set to 50mm or more. Usually, it is the range of 400mm from the diameter of 150mm. When smaller than 50mm, the difference of a part with the narrowest clearance between the down-stream lip 15 and a base material 12 and a large part becomes large too much due to the radius of curvature of a roll 13, and the amount of the coating of liquid pool **** 17 increases as a result. Consequently, the spreading termination 22 will be confused, without the ability attracting 17 coatings of liquid pool **** to a nozzle 1 at the time of a spreading halt.

[0100] Moreover, the slit gap SG of a slit 7 is set to 0.1mm or more and 2mm or less. When the slit gap SG is smaller than 0.1mm and a coating 11 is attracted, the slit gap SG is too small, and resistance of the flowing coating 11 becomes large and it becomes impossible to attract the inside of a slit 7. Moreover, if the slit gap SG is longer than 2mm, there are too many amounts of the coating of the outlet section of a slit 7, and it is impossible to make spreading termination 22 linear.

[0101] Moreover, the gap of the point of a nozzle 1 and the base material 12 supported by the roll 13 has 2 desirablemm or less. If larger than 2mm, the amount of the coating 11 which exists in the clearance between the point of a nozzle 1 and a base material 12 will increase too much, and it cannot draw in inside a nozzle 1 at the time of a spreading halt, and it becomes difficult to make spreading termination 22 linear.

[0102] According to the gestalt of this operation, the field length L1 of the down-stream lip 15 is 2mm, and intermittent spreading of the coating with a viscosity of 5poise which distributed carbon with a mean particle diameter of 5 micrometers was carried out as a base material at the film with a thickness of 20 micrometers using four nozzles whose amounts d of ejection of the upper lip 14 are 3 micrometers, 5 micrometers, 1000 micrometers, and 1100 micrometers. After applying die length of 100mm to the base material transit direction, intermittent spreading which prepares the part which is not applied 10mm was repeated, and was performed. The travel speeds of a film are 20 m/min and coverage is 80 cc/m².

[0103] According to the gestalt of this operation, the amount d of ejection of the upper lip 14 does not have the impasto in the spreading start edge 24 further by the ability making linear the spreading termination 22 and the spreading start edge 24 of the spreading section 23 which applied the coating 11 to the base material 12 as a nozzle (5 micrometers and 1000 micrometers) showed to drawing 16, either, and intermittent spreading of uniform thickness was completed in the film transit direction. On the other hand, as a result of the amount d of ejection of the upper lip 14 performing same intermittent spreading by the nozzle (3 micrometers and 1100 micrometers) and the conventional example, as shown in drawing 15, as for the spreading start edge 24, the spreading termination 22 and the spreading start edge 24 of the spreading section 23 are turbulence and a pan with impasto. The above result shows that the effectiveness of the gestalt of this operation is excellent.

[0104] (Gestalt 5 of operation) The gestalt 5 of operation is related with the intermittent coater of invention according to claim 5. About the gestalt of this operation, as shown in drawing 9, the biggest description is in the configuration of the lip point of a nozzle 1. Let the point 28 of the down-stream lip 15 prepared in the downstream from the slit 7 be the Sharp edge to the transit direction of a base material 12. Although especially the upper lip 14 is not limited, it usually makes the field length of the transit direction of a base material 12 the range of 0.2mm or more and 5mm or less. In addition, the installation hole 16 is for attaching the housing 5 shown in drawing 1. Other configurations are the same as the gestalt 1 of the above-mentioned implementation.

[0105] In the above-mentioned configuration, the condition of having applied the coating 11 to the base material 12 which carries out continuation transit using the nozzle 1 of the gestalt of this operation is shown in drawing 10, and drawing 11 shows the condition of having suspended spreading.

[0106] the time of spreading -- setting -- a pump (not shown) etc. -- a coating 11 -- a charging line 8 -- a passage -- housing 5 -- having prepared -- input -- 18 -- a passage -- a head 2 -- the supply way 3 is flowed, and it flows into the manifold 6 of a nozzle 1, extrudes from a slit 7 further, and is applied on the base material 12 which is

supported by the roll 13 and carries out continuation transit.

[0107] By moving a head 2 in the direction of arrow-head A at the time of a spreading halt, the suction section 25 can be formed and the coating 11 which exists between the down-stream lip 15 of a nozzle 1 and base materials 12 and in the outlet section of a slit 7 can be attracted inside a nozzle 1. With the gestalt of this operation, since the point 28 of the down-stream lip 15 is used as the Sharp edge and there are very few amounts which ***** does not exist between the down-stream lip 15 and a base material 12, therefore attract a coating by migration of a head 2, the coating 11 which certainly exists between a nozzle 1 and a base material 12 can be drawn in the nozzle 1 interior. Consequently, also when there is much coverage, the spreading termination 22 and the spreading start edge 24 of the spreading section 23 can be made linear.

[0108] Moreover, the slit gap SG of a slit 7 is set to 0.1mm or more and 2mm or less. When the slit gap SG is smaller than 0.1mm and a coating 11 is attracted, the slit gap SG is too small, and resistance of the flowing coating 11 becomes large and it becomes impossible to attract the inside of a slit 7. Moreover, if the slit gap SG is longer than 2mm, there are too many amounts of the coating 11 of the outlet section of a slit 7, and ** is impossible for making linear the spreading termination 22 and the spreading start edge 24 of the spreading section 23.

[0109] The amount of the coating 11 to attract is equivalent to the volume of the suction section 25 formed by migration of a head 2. The inlet port of the supply way 3 is blockaded by the sliding surface of housing 5, and a coating 11 passes along a charging line 8, flows the return way 4 of a head 2 from the input 18 established in housing 5, and flows for the return piping 9. Therefore, in the time of a spreading halt, since the rise of the paint pressure force in a charging line 8 can be controlled, when a head 2 is moved in the direction of arrow-head B at the time of resumption of spreading and supply of the coating to a nozzle 1 is started, the paint pressure force of a nozzle 1 is not raised. For this reason, the impasto of the spreading start edge 24 can be controlled.

[0110] In addition, as for a head 2, a cross-section configuration may attach a baffle pin (not shown) etc. by the square shape, the polygon form, or the round shape for niting.

[0111] Another description of the gestalt of this operation only moves a head 2 in the direction of arrow-head A, the return of it is carry out at the same time it intercepts supply of the coating to a nozzle 1, and it is to have three functions, cutoff and the return that the coating which exists between the point of a nozzle 1 and base materials 12 and in the slit outlet section further can be attract inside a nozzle 1, and suction.

[0112] In the gestalt of this operation, it is desirable that the nozzle side edge side 26 and the slit side 27 of a head 2 turn into the same flat surface at the time of spreading. By considering as the same flat surface, in order that there may be no unnecessary irregularity, the slit side 27 is not covered with a coating 11, but generating of a coating muscle can be controlled with the lump of a coating etc. during spreading.

[0113] Moreover, the gap of the point of a nozzle 1 and the base material 12 supported by the roll 13 has 2 desirablenmm or less. If larger than 2mm, the amount of the coating 11 which exists in the clearance between the point of a nozzle 1 and a base material 12 will increase too much, and it cannot draw in inside a nozzle 1 at the time of a spreading halt, and it becomes difficult to make linear the spreading termination 22 and the spreading start edge 24 of the spreading section 23.

[0114] According to the gestalt of this operation, intermittent spreading of the coating with a viscosity of 5poise which distributed carbon with a mean particle diameter of 5 micrometers was carried out as a base material at the film with a thickness of 20 micrometers. After applying die length of 100mm to the transit direction of a base material 12, intermittent spreading which prepares the part which is not applied 10mm was repeated, and was performed. The travel speeds of a film are 20 m/min and coverage is 80 cc/m².

[0115] According to the gestalt of this operation, as shown in drawing 16, the spreading termination 22 and the spreading start edge 24 of the spreading section 23 which applied the coating 11 could be made linear, further, there is also no impasto in the spreading start edge 24 in a base material 12, and intermittent spreading of uniform thickness was completed in it in the film transit direction. On the other hand, as a result of the conventional example's performing same intermittent spreading, as shown in drawing 15, as for the spreading start edge 24, the spreading termination 22 and the spreading start edge 24 of the spreading section 23 are turbulence and a pan with impasto. The above result shows that the effectiveness of the gestalt of this operation is excellent.

[0116] The gestalt 6 of operation is a thing about the intermittent method of application of invention according to claim 16. (Gestalt 6 of operation) When it explains referring to drawing 1 and drawing 2, it has the spreading

process and spreading halt process which apply the coating 11 supplied to the nozzle 1 by the head 2 on the base material 12 which carries out continuation transit. A spreading halt process At the same time it intercepts the flow of the coating 11 to a nozzle 1 and leads in addition to nozzle 1 The coating 11 of the nozzle 1 interior and the outlet section of a slit 7 is attracted in the suction section 25 prepared in the nozzle 1 interior. A spreading process The coating 11 attracted by the suction section 25 is returned to the nozzle 1 interior at the same time it opens the flow of the coating 11 to a nozzle 1. The amount of the coating 11 attracted is made into 3 or more [0.1mm / per slit width of 10mm of a nozzle 1], and 3 or less [500mm], and carries out spreading formation of the coating 11 intermittently on a base material 12.

[0117] namely, the time of spreading -- setting -- a pump (not shown) etc. -- a coating 11 -- a charging line 8 -- a passage -- housing 5 -- having prepared -- input -- 18 -- a passage -- a head 2 -- the supply way 3 is flowed, and it flows into the manifold 6 of a nozzle 1, extrudes from a slit 7 further, and is applied on the base material 12 which is supported by the roll 13 and carries out continuation transit.

[0118] By moving a head 2 in the direction of arrow-head A at the time of a spreading halt, the suction section 25 can be formed and the coating which exists between the point of a nozzle 1 and base materials 12 and in the slit outlet section can be attracted inside a nozzle 1. Therefore, at the time of a spreading halt, spreading termination can be made linear. The amount of the coating 11 to attract is equivalent to the volume of the suction section 25 formed by migration of a head 2.

[0119] The inlet port of the supply way 3 is blockaded by the sliding surface of housing 5, and a coating 11 flows the return way 4 of a head 2 from the input 18 established in housing 5 through the charging line 8, and flows for the return piping 9. Therefore, since the rise of the paint pressure force in a charging line 8 can be controlled also in the time of a spreading halt, when a head 2 is moved in the direction of arrow-head B at the time of resumption of spreading and supply of the coating to a nozzle 1 is started, the paint pressure force of a nozzle 1 is not raised. For this reason, the impasto of the spreading start edge can be controlled.

[0120] The biggest description of the gestalt of this operation is in the amount of the coating attracted inside a nozzle 1 by the head 2. That is, the amount of the coating attracted is made into 3 or more [0.1mm / per slit width of 10mm of a nozzle 1], and 3 or less [500mm]. When fewer than this range, there are too few amounts to attract, a coating 11 remains between a nozzle 1 and a base material 12, and it stops being able to make an edge linear always [spreading].

[0121] Moreover, although surely spreading termination will be linearly made if many coatings 11 are attracted rather than said range, the spreading start edge will be confused. When moving a head 2 in the direction of arrow-head A at the time of a spreading halt and attracting a coating to the suction section 25, since there are many amounts of suction, this reason will be in the condition that the coating was drawn even in the interior of a slit 7. It becomes a product-performance top problem at the same time it involves in air, consequently air is involved in the paint film of a spreading leader and a spreading leader is confused, while flowing the slit 7 interior when extruding the coating 11 attracted at the time of resumption of spreading.

[0122] In addition, as for a head 2, a cross-section configuration may attach a baffle pin (not shown) etc. by the square shape, the polygon form, or the round shape for niting.

[0123] The biggest description of the gestalt of this operation only move a head 2 in the direction of arrow head A , the return of it be carry out at the same time it intercept supply of the coating to a nozzle 1 , and it be to have three functions , cutoff and the return that the coating which exist between the point of a nozzle 1 and base materials 12 and in the slit outlet section further can be attract inside a nozzle 1 , and suction .

[0124] In the gestalt of this operation, it is desirable that the nozzle side edge side 26 and the slit side 27 of a head 2 turn into the same flat surface at the time of spreading. By considering as the same flat surface, in order that there may be no unnecessary irregularity, the slit side 27 is not covered with a coating, but generating of a coating muscle can be controlled with the lump of a coating etc. during spreading.

[0125] Although the point configuration of a nozzle 1 is a flat surface in drawing 1 , about the gestalt of this operation, you may not necessarily be a flat surface. For example, the shape of the curved configuration with radius of curvature and a polygon and the Sharp edge configuration are sufficient.

[0126] Moreover, the gap of the point of a nozzle 1 and the base material 12 supported by the roll 13 has 2 desirablenmm or less. If larger than 2mm, the amount of the coating which exists in the clearance between the point of a nozzle 1 and a base material 12 will increase too much, and it cannot draw in inside a nozzle 1 at the time of a spreading halt, and it becomes difficult to make spreading termination linear.

[0127] According to the gestalt of this operation, intermittent spreading of the coating with a viscosity of 5poise which distributed carbon with a mean particle diameter of 5 micrometers was carried out as a base material at the film with a thickness of 20 micrometers. After applying die length of 100mm to the base material transit direction, intermittent spreading which prepares the part which is not applied 10mm was repeated, and was performed. The travel speeds of a film are 20 m/min and coverage is 80 cc/m².

[0128] According to the gestalt of this operation, as shown in drawing 16, the spreading termination 22 and the spreading start edge 24 of the spreading section 23 which applied the coating 11 could be made linear, further, there is also no impasto in the spreading start edge 24 in a base material 12, and intermittent spreading of uniform thickness was completed in it in the film transit direction. On the other hand, as a result of the conventional example's performing same intermittent spreading, as shown in drawing 15, as for the spreading start edge 24, the spreading termination 22 and the spreading start edge 24 of the spreading section 23 are turbulence and a pan with impasto. The above result shows that the effectiveness of the gestalt of this operation is excellent.

[0129] The gestalt 7 of operation is a thing about the intermittent method of application of invention according to claim 17. (Gestalt 7 of operation) When it explains referring to drawing 12, it has the spreading process and spreading halt process which apply the coating 11 supplied to the nozzle 1 by the head 2 on the base material 12 which carries out continuation transit. A spreading halt process Air is sprayed from an air nozzle 28 between the point of a nozzle 1, and a base material 12. At the same time it furthermore intercepts the flow of the coating 11 to a nozzle 1 and leads in addition to nozzle 1 The coating 11 of the nozzle 1 interior and the outlet section of a slit 7 is attracted in the suction section 25 prepared in the nozzle 1 interior. A spreading process The coating 11 attracted by the suction section 25 is returned to the nozzle 1 interior, and spreading formation of the coating 11 is intermittently carried out on a base material 12 at the same time it opens the flow of the coating 11 to a nozzle 1.

[0130] the time of spreading -- setting -- a pump (not shown) etc. -- a coating 11 -- a charging line 8 -- a passage -- housing 5 -- having prepared -- input -- 18 -- a passage -- a head 2 -- the supply way 3 is flowed, and it flows into the manifold 6 of a nozzle 1, extrudes from a slit 7 further, and is applied on the base material 12 which is supported by the roll 13 and carries out continuation transit.

[0131] By moving a head 2 in the direction of arrow-head A at the time of a spreading halt, the suction section 25 can be formed and the coating 11 which exists between the point of a nozzle 1 and base materials 12 and in the outlet section of a slit 7 can be attracted inside a nozzle 1. It can come, simultaneously air is sprayed in the slit width direction between a nozzle 1 and a base material 12 from the air nozzle 28 which is the biggest description of the gestalt of this operation, and the coating which exists in a clearance is blown away. Therefore, at the time of a spreading halt, it can consider as the condition that a coating does not exist at all between a nozzle 1 and a base material 12, and spreading termination can be made linear.

[0132] The inlet port of the supply way 3 is blockaded by the sliding surface of housing 5, and a coating 11 passes along a charging line 8, flows the return way 4 of a head 2 from the input 18 established in housing 5, and flows for the return piping 9. Therefore, since the rise of the paint pressure force in a charging line 8 can be controlled also in the time of a spreading halt, when a head 2 is moved in the direction of arrow-head B at the time of resumption of spreading and supply of the coating to a nozzle 1 is started, the paint pressure force of a nozzle 1 is not raised. For this reason, the impasto of the spreading start edge can be controlled.

[0133] In addition, as for a head 2, a cross-section configuration may attach a baffle pin (not shown) etc. by the square shape, the polygon form, or the round shape for niting.

[0134] The gestalt of this operation only moves a head 2 in the direction of arrow-head A, the return of it is carried out at the same time it intercepts supply of the coating to a nozzle 1, and it has the description of three functions, cutoff and the return that the coating which exists between the point of a nozzle 1 and base materials 12 and in the outlet section of a slit 7 further can be attracted inside a nozzle 1, and suction **.

[0135] In the gestalt of this operation, it is desirable that the nozzle side edge side 26 and the slit side 27 of a head 2 turn into the same flat surface at the time of spreading. By considering as the same flat surface, in order that there may be no unnecessary irregularity, the slit side 27 is not covered with a coating 11, but generating of a coating muscle can be controlled with the lump of a coating etc. during spreading.

[0136] Although the point configuration of a nozzle 1 is a flat surface in drawing 12, it may not necessarily be a flat surface about the gestalt of this operation. For example, the shape of the curved configuration with radius

of curvature and a polygon and the Sharp edge configuration are sufficient.

[0137] Moreover, the gap of the point of a nozzle 1 and the base material 12 supported by the roll 13 has 2 desirablenmm or less. If larger than 2mm, the amount of the coating which exists in the clearance between the point of a nozzle 1 and a base material 12 will increase too much, and it cannot draw in inside a nozzle 1 at the time of a spreading halt, and it becomes difficult to make spreading termination linear.

[0138] According to the gestalt of this operation, intermittent spreading of the coating with a viscosity of 5poise which distributed carbon with a mean particle diameter of 5 micrometers was carried out as a base material at the film with a thickness of 20 micrometers. After applying die length of 100mm to the base material transit direction, intermittent spreading which prepares the part which is not applied 10mm was repeated, and was performed. The travel speeds of a film are 20 m/min and coverage is 80 cc/m².

[0139] According to the gestalt of this operation, as shown in drawing 16, the spreading termination 22 and the spreading start edge 24 of the spreading section 23 which applied the coating 11 could be made linear, further, there is also no impasto in the spreading start edge 24 in a base material 12, and intermittent spreading of uniform thickness was completed in it in the film transit direction. On the other hand, as a result of the conventional example's performing same intermittent spreading, as shown in drawing 15, as for the spreading start edge 24, the spreading termination 22 and the spreading start edge 24 of the spreading section 23 are turbulence and a pan with impasto. The above result shows that the effectiveness of the gestalt of this operation is excellent.

[0140] The gestalt 8 of operation is a thing about the intermittent method of application of invention according to claim 18. (Gestalt 8 of operation) When it explains referring to drawing 13 and drawing 14, it has the spreading process and spreading halt process which apply the coating 11 supplied to the nozzle 2 by the head 2 on the base material 12 which carries out continuation transit. The coating 11 of the nozzle 1 interior and the outlet section of a slit 7 is attracted in the suction section 25 prepared in the nozzle 1 interior at the same time a spreading halt process intercepts the flow of the coating 11 to a nozzle 1 and it leads in addition to nozzle 1. The pressure inside the nozzle [in / a spreading process returns the coating 11 attracted by the suction section 25 while opening the flow of the coating 11 to a nozzle 1 to the nozzle 1 interior, and / a spreading process] 1, or the pressure in piping in front of a nozzle, The pressure of the flow of the coating 11 led in addition to nozzle 1 in a spreading halt process is made equivalent, and spreading formation of the coating 11 is intermittently carried out on a base material 12.

[0141] the time of spreading -- setting -- a pump (not shown) etc. -- a coating 11 -- a charging line 8 -- a passage -- housing 5 -- having prepared -- input -- 18 -- a passage -- a head 2 -- the supply way 3 is flowed, and it flows into the manifold 6 of a nozzle 1, extrudes from a slit 7 further, and is applied on the base material 12 which is supported by the roll 13 and carries out continuation transit.

[0142] By moving a head 2 in the direction of arrow-head A at the time of a spreading halt, the suction section 25 can be formed and the coating 11 which exists between the point of a nozzle 1 and base materials 12 and in the slit outlet section can be attracted inside a nozzle 1. Therefore, at the time of a spreading halt, spreading termination can be made linear. The amount of the coating 11 to attract is equivalent to the volume of the suction section formed by migration of a head 2. The inlet port of the supply way 3 is blockaded by the sliding surface of housing 5, and a coating 11 flows the return way 4 of a head 2 from the input 18 established in housing 5 through the charging line 8, and flows for the return piping 9.

[0143] The greatest description of the gestalt of this operation is forming a pressure gage 29 in the return piping 9 at a pressure gage 30, a flow control valve 31, and a nozzle 1, and having made the pressure in the return piping 9 at the time of a spreading halt the pressure and EQC in the nozzle 1 at the time of spreading by adjustment of a flow control valve 31. Consequently, although it will become thin ** since the regurgitation of the coating to a nozzle 1 decreases at the time of resumption of spreading when the pressure in the piping 9 at the time of a return declines, according to this invention, it becomes possible to apply to homogeneity by predetermined thickness from the time of resumption of spreading.

[0144] Furthermore, since the rise of the paint pressure force in a charging line 8 can also be controlled also in the time of a spreading halt, when a head 2 is moved in the direction of arrow-head B at the time of resumption of spreading and supply of the coating to a nozzle 1 is started, the paint pressure force of a nozzle 1 is not raised. For this reason, the impasto of the spreading start edge can also be controlled.

[0145] In addition, as for a head 2, a cross-section configuration may attach a baffle pin (not shown) etc. by the

square shape, the polygon form, or the round shape for niting.

[0146] The biggest description of the gestalt of this operation only move a head 2 in the direction of arrow head A, the return of it be carry out at the same time it intercept supply of the coating 11 to a nozzle 1, and it be to have three functions, cutoff and the return that the coating 11 which exist between the point of a nozzle 1 and base materials 12 and in the outlet section of a slit 7 further can be attract inside a nozzle 1, and suction.

[0147] In the gestalt of this operation, it is desirable that the side edge side 26 and the slit side 27 of a nozzle 1 of a head 2 turn into the same flat surface at the time of spreading. By considering as the same flat surface, in order that there may be no unnecessary irregularity, the slit side 27 is not covered with a coating, but generating of a coating muscle can be controlled with the lump of a coating etc. during spreading.

[0148] Although the point configuration of a nozzle 1 is a flat surface in drawing 13 and drawing 14, about the gestalt of this operation, you may not necessarily be a flat surface. For example, the shape of the curved configuration with radius of curvature and a polygon and the Sharp edge configuration are sufficient.

[0149] Moreover, the gap of the point of a nozzle 1 and the base material 12 supported by the roll 13 has 2 desirablenmm or less. If larger than 2mm, the amount of the coating which exists in the clearance between the point of a nozzle 1 and a base material 12 will increase too much, it cannot draw in inside a nozzle 1 at the time of a spreading halt, and it will become difficult to make spreading termination linear.

[0150] According to the gestalt of this operation, intermittent spreading of the coating with a viscosity of 5poise which distributed carbon with a mean particle diameter of 5 micrometers was carried out as a base material at the film with a thickness of 20 micrometers. After applying die length of 100mm to the base material transit direction, intermittent spreading which prepares the part which is not applied 10mm was repeated, and was performed. The travel speeds of a film are 20 m/min and coverage is 80 cc/m².

[0151] According to the gestalt of this operation, as shown in drawing 16, the spreading termination 22 and the spreading start edge 24 of the spreading section 23 which applied the coating 11 could be made linear, further, there is also no impasto in the spreading start edge 24 in a base material 12, and intermittent spreading of uniform thickness was completed in it in the film transit direction. On the other hand, as a result of the conventional example's performing same intermittent spreading, as shown in drawing 15, as for the spreading start edge 24, the spreading termination 22 and the spreading start edge 24 of the spreading section 23 are turbulence and a pan with impasto. The above result shows that the effectiveness of the gestalt of this operation is excellent.

[0152] The gestalt 9 of operation is a thing about the intermittent method of application of invention according to claim 19. (Gestalt 9 of operation) When it explains referring to drawing 3 from drawing 1, it has the spreading process and spreading halt process which apply the coating 11 supplied to the nozzle 1 by the head 2 on the base material 12 which carries out continuation transit. A spreading halt process The coating 11 of the nozzle 1 interior and the outlet section of a slit 7 is attracted in the suction section 25 prepared in the nozzle 1 interior at the same time it intercepts the flow of the coating 11 to a nozzle 1 and leads in addition to nozzle 1. When the coating 11 attracted by the suction section 25 is returned to the nozzle 1 interior and transit lay length of the base material 12 of the downstream lip 15 of a nozzle 1 is set to L1 at the same time a spreading process opens the flow of the coating 11 to a nozzle 1, it is made into $1 \leq 3\text{mm}$ of $0.1 \text{ mm} \leq L$. It considers as $1 \leq 2\text{mm}$ of $0.1 \text{ mm} \leq L$ still more preferably. Although it does not limit especially concerning L2, it usually considers as the range of 0.2mm or more and 5mm or less. The amount of the coating 11 attracted is made into 3 or more [0.1mm / per slit width of 10mm of a nozzle 1], and 3 or less [500mm], and carries out spreading formation of the coating 11 intermittently on a base material 12. Although surely the amount of the coating of liquid pool **** 17 decreases the transit lay length of the base material 12 of the downstream lip 15 of a nozzle 1 when L1 is smaller than 0.1mm, die length is too short, and a pressure is not applied to the clearance between the downstream lip 15 and a base material 12, but the homogeneity of crosswise thickness is spoiled. Moreover, if L1 is longer than 3mm, there are too many amounts of the coating of liquid pool **** 17, and it is impossible to make spreading termination linear. Moreover, since the viscosity of a coating stops further easily being able to attract the coating of liquid pool **** 17 inside a nozzle 1 1poise or more in being high, L1 has 2 desirablenmm or less.

[0153] the time of spreading -- setting -- a pump (not shown) etc. -- a coating 11 -- a charging line 8 -- a passage -- housing 5 -- having prepared -- input -- 18 -- a passage -- a head 2 -- the supply way 3 is flowed, and it flows into the manifold 6 of a nozzle 1, extrudes from a slit 7 further, and is applied on the base material 12 which is

supported by the roll 13 and carries out continuation transit.

[0154] By moving a head 2 in the direction of arrow-head A at the time of a spreading halt, the suction section 25 can be formed and the coating 11 which exists between the point of a nozzle 1 and base materials 12 and in the outlet section of a slit 7 can be attracted inside a nozzle 1. Therefore, at the time of a spreading halt, spreading termination can be made linear. The amount of the coating 11 to attract is equivalent to the volume of the suction section 25 formed by migration of a head 2.

[0155] The inlet port of the supply way 3 is blockaded by the sliding surface of housing 5, and a coating 11 flows the return way 4 of a head 2 from the input 18 established in housing 5 through the charging line 8, and flows for the return piping 9. Therefore, since the rise of the paint pressure force in a charging line 8 can be controlled also in the time of a spreading halt, when a head 2 is moved in the direction of arrow-head B at the time of resumption of spreading and supply of the coating to a nozzle 1 is started, the paint pressure force of a nozzle 1 is not raised. For this reason, the impasto of the spreading start edge can be controlled.

[0156] It is in the amount of the coating 11 which attracts another big description inside a nozzle 1 by the head 2 further of the gestalt of this operation. That is, the amount of the coating 11 attracted is made into 3 or more [0.1mm / per slit width of 10mm of a nozzle 1], and 3 or less [500mm]. When fewer than this range, there are too few amounts to attract, a coating 11 remains between a nozzle 1 and a base material 12, and it stops being able to make an edge linear always [spreading]. Moreover, although surely spreading termination will be linearly made if many coatings are attracted rather than said range, the spreading start edge will be confused.

[0157] When moving a head 2 in the direction of arrow-head A at the time of a spreading halt and attracting a coating to the suction section 25, since there are many amounts of suction, this reason will be in the condition that the coating was drawn even in the interior of a slit 7. It becomes a product-performance top problem at the same time it involves in air, consequently air is involved in the paint film of a spreading leader and a spreading leader is confused, while flowing the interior of a slit 7 when extruding the coating 11 attracted at the time of resumption of spreading.

[0158] In addition, as for a head 2, a cross-section configuration may attach a baffle pin (not shown) etc. by the square shape, the polygon form, or the round shape for niting.

[0159] The biggest description of the gestalt of this operation only move a head 2 in the direction of arrow head A, the return of it be carry out at the same time it intercept supply of the coating to a nozzle 1, and it be to have three functions, cutoff and the return that the coating which exist between the point of a nozzle 1 and base materials 12 and in the slit outlet section further can be attract inside a nozzle 1, and suction.

[0160] In the gestalt of this operation, it is desirable that the nozzle side edge side 26 and the slit side 27 of a head 2 turn into the same flat surface at the time of spreading. By considering as the same flat surface, in order that there may be no unnecessary irregularity, the slit side 27 is not covered with a coating, but generating of a coating muscle can be controlled with the lump of a coating etc. during spreading.

[0161] Although the point configuration of a nozzle 1 is a flat surface in drawing 1, about the gestalt of this operation, you may not necessarily be a flat surface. For example, the shape of the curved configuration with radius of curvature and a polygon and the Sharp edge configuration are sufficient.

[0162] Moreover, the gap of the point of a nozzle 1 and the base material 12 supported by the roll 13 has 2 desirablenmm or less. If larger than 2mm, the amount of the coating which exists in the clearance between the point of a nozzle 1 and a base material 12 will increase too much, and it cannot draw in inside a nozzle 1 at the time of a spreading halt, and it becomes difficult to make spreading termination linear.

[0163] According to the gestalt of this operation, intermittent spreading of the coating with a viscosity of 5poise which distributed carbon with a mean particle diameter of 5 micrometers was carried out as a base material at the film with a thickness of 20 micrometers. After applying die length of 100mm to the base material transit direction, intermittent spreading which prepares the part which is not applied 10mm was repeated, and was performed. The travel speeds of a film are 20 m/min and coverage is 80 cc/m².

[0164] According to the gestalt of this operation, as shown in drawing 16, the spreading termination 22 and the spreading start edge 24 of the spreading section 23 which applied the coating 11 could be made linear, further, there is also no impasto in the spreading start edge 24 in a base material 12, and intermittent spreading of uniform thickness was completed in it in the film transit direction. On the other hand, as a result of the conventional example's performing same intermittent spreading, as shown in drawing 15, as for the spreading start edge 24, the spreading termination 22 and the spreading start edge 24 of the spreading section 23 are

turbulence and a pan with impasto. The above result shows that the effectiveness of the gestalt of this operation is excellent.

[0165] (Gestalt 10 of operation) The gestalt 10 of operation is explained about invention according to claim 22, referring to drawing 1 and drawing 2. In addition, with the gestalt of this operation, it applies on the charge collector which replaced with the coating 11 in drawing 1 and drawing 2, and was replaced with the base material 12 using the active material paste.

[0166] The gestalt of this operation has the spreading process and spreading halt process which are applied on the charge collector which carries out continuation transit of the active material paste supplied to the nozzle 1 by the head 2. Namely, a spreading halt process At the same time it intercepts the flow of the active material paste to a nozzle 1 and leads in addition to nozzle 1 The active material paste of the nozzle 1 interior and the outlet section of a slit 7 is attracted in the suction section 25 prepared in the nozzle 1 interior. A spreading process The active material paste attracted by the suction section 25 is returned to the nozzle 1 interior, and spreading formation of the active material paste is intermittently carried out on a charge collector at the same time it opens the flow of the active material paste to a nozzle 1.

[0167] The active material paste used for the gestalt of this operation can create an electrode active material, an electric conduction agent, a binder, a solvent, etc. using a batch type mixer, a continuous system kneading machine, a dissolver, a homogenizer, etc.

[0168] Although H^+ , Li^+ , Na^+ , and K^+ should just be the compounds which can be inserted or emitted as an electrode active material, the oxide which made transition-metals chalcogenide, a carbonaceous ingredient, etc. the subject can be used, and lithium content transition-metals oxide, transition-metals oxide, and the oxide that made the carbonaceous ingredient the subject are especially desirable. It is desirable to make Mn, Co, nickel, V, and Fe into a subject as transition metals. Specifically, $LiCoO_2$, $LiNiO_2$, $LiCo_{0.5}nickel_{0.5}O_2$, $LiMn_2O_4$, $LiCo_{0.9}Al_{0.1}O_2$, Fe_3O_4 , etc. are raised. About a carbonaceous ingredient, 3.35 - 3.80 Å (angstrom) and a consistency have [the spacing of the 2nd page of OO] desirable 1.1 - 1.7 g/cm³, and a graphite, petroleum coke, cresol resin baking carbon, FERAN resin baking carbon, polyacrylonitrile fiber baking carbon, vapor growth carbon, meso face pitch baking carbon, etc. can be used.

[0169] If it is an electronic conduction nature ingredient which does not cause a chemical change in the constituted cell, although an electric conduction agent is good, it can usually include conductive ingredients, such as natural deep black lead (a phosphorus-like graphite, phosphorus flaky graphite, etc.), an artificial graphite, carbon black, acetylene black, KETCHIEN black, and a carbon fiber, as a simple substance or mixture anything.

[0170] As a binder, simple substances or such mixture can be used for the polymer which has polysaccharide, such as cull BOSHICI methyl cellulose (it omits Following CMC.), polyvinyl alcohol, fluororesin, formal system resin, acetal system resin, an acrylic / styrene system copolymerization resin, and styrene / butadiene system copolymerization resin (it abbreviates to SBR system resin below.), thermoplastics, and rubber elasticity at least. You may carry out soluble [of the binder] to a solvent, and it may be distributed or suspended.

[0171] Although especially a solvent is not made to limit, a polar high thing is desirable, for example, can use water, ethyl alcohol, N-methyl pyrrolidone, toluene, a methyl ethyl ketone, methyl isobutyl ketone, a cyclohexanone, ethanol, a methanol, butyl acetate, etc.

[0172] A charge collector is considered as a continuum, a punching metal, a network, etc. using metallic foils, inorganic oxides, etc., such as aluminum, copper, nickel, and stainless steel.

[0173] Intermittent spreading is carried out at the charge collector which carries out continuation transit of the above-mentioned active material paste using the above-mentioned intermittent coater, and it becomes possible by preparing the uncoated portion for making the lead section form crosswise [of a charge collector] to skip an exfoliation process, and the active material fine particles which exfoliated do not adhere to a plate front face. Moreover, since there is no mechanical stress when stripping off an active material layer by intermittent coating as compared with the plate which passed through the conventional exfoliation process, the adhesive property of an active material improves in the interface of an active material layer and a charge collector. According to such effectiveness, the cell discharge capacity, the rate property, and whose cycle property improved can be obtained.

[0174] Hereafter, the manufacture approach of a lithium secondary battery is explained for this invention as an example.

(Example) After kneading MESOFFEZUPITCHI baking carbon, SBR system resin, and a CMC1wt% water solution using continuous system 2 shaft kneading equipment, the opening filtered with the filter made from stainless steel which is 0.1mm, and obtained the negative-electrode active material coating. The negative-electrode plate which has the 400mm spreading section and a 20mm uncoated portion was obtained using the intermittent coater which showed the obtained coating to the gestalt 1 of operation on a copper charge collector.

[0175] After kneading LiCoO₂, conductive carbon black, fluororesin, and a CMC1wt% water solution using continuous system 2 shaft kneading equipment, the opening filtered with the filter made from stainless steel which is 0.1mm, and obtained the positive-active-material coating. Intermittent spreading of the obtained active material coating was carried out on the aluminum charge collector using the same intermittent coater as a negative electrode, and the positive-electrode plate which has the 390mm spreading section and a 5mm uncoated portion was obtained.

[0176] The slit of obtained forward and the negative-electrode plate was carried out to predetermined width of face, respectively, and A size rechargeable lithium-ion battery was obtained.

[0177] (Example of a comparison) Using the same coating as the above-mentioned example, the positive electrode and the negative-electrode active material coating were continuously applied by the comma direct coat method, and produced the cell electrode. It exfoliated so that it might have the same uncoated portion as an example, and the slit of the positive electrode and negative-electrode plate which were obtained was carried out to predetermined width of face, respectively, and A size rechargeable lithium-ion battery was obtained.

[0178] The following evaluations were performed about each obtained sample.

(1) the cell which completed initial charge of an electrical-potential-difference percent defective -- 45-degree C constant temperature -- when the amplitude measurement was carried out and it asked for the number which was less than [3.9V] after having taken out after saving for two weeks within a layer, and returning to ordinary temperature, in the example, 15 pieces occurred among 1000 pieces in the example of a comparison to having been one piece among 1000 pieces.

[0179] When the cell which raised poor super-power was disassembled, the plate of the example of a comparison had many active material omission in an exfoliation boundary part, and many omissive active materials were seen. In the example, most omission of the active material in an exfoliation boundary part were not seen, but it turned out that the adhesive property is improved.

[0180] (2) Discharge capacity [mAh]

In the room temperature, it discharged with the fixed current (from 160mA to 3200mA), and discharge capacity when the electrical potential difference which falls from discharge starting reaches a termination electrical potential difference (2.0V) compared the rechargeable battery which completed charge on the fixed current (160mA) and termination electrical potential difference (4.2V). In the example, there was little dispersion in capacity and it turned out that a discharge capacity fall is hardly seen. Drawing 17 is the example of the discharge voltage curve when performing discharge volumetry.

[0181] (3) Cycle life [the count of a cycle]

In the room temperature, charge and discharge were repeated on fixed conditions (discharge: 1600mA of currents, termination electrical-potential-difference 2.0V, 160mA of charge: currents, termination electrical-potential-difference 4.2V), discharge capacity was measured, and the count of charge and discharge when becoming 90% of initial discharge capacity (cycle) compared. Although it became 90% in 600 cycles in the example of a comparison, in the example, also in 1000 cycles, most degradation was not seen, but the rate of degradation has been improved extremely, and there was almost no capacity variation further.

[0182] Moreover, when the cell which finished cycle evaluation was disassembled and the plate condition was observed, as for the plate by the example of a comparison, many omission of the active material layer of the part into which omission of an active material layer were seen and exfoliated especially were seen. On the other hand, in the example, most omission of an active material were not observed but it turned out that the adhesive property has not deteriorated. Moreover, in the example of a comparison, the deposit of a lithium was found on the plate front face. When observation by the electron microscope photograph was performed, it turned out that the exfoliation active material which adhered on the plate became a nucleus, and the deposit has taken place. Drawing 18 is the example of the discharge capacity change to the count of charge and discharge when performing cycle-life measurement.

[0183] It was able to apply to the manufacturing method of a lithium secondary battery as mentioned above, and the effectiveness of the intermittent coater of this invention was able to be checked.

[0184] In addition, in the above-mentioned example, although only the manufacture approach of a lithium secondary battery was indicated, also by the manufacture approach of a positive-electrode electrode, the same effectiveness is acquired and the same effectiveness can be acquired also in forward [of a nickel-cadmium battery or a nickel hydride battery], and a negative electrode.

[0185]

[Effect of the Invention] The coating which was supplied from intermittent equipment as mentioned above on the base material which carries out continuation transit according to the intermittent coater of this invention is applied by the nozzle. An intermittent means Said coating of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle at the same time it intercepts the flow of said coating to said nozzle and leads in addition to said nozzle at the time of a spreading halt. Since it constituted at the time of resumption of spreading so that said coating attracted in said predetermined location might be returned to said interior of a nozzle while opening the flow of said coating to said nozzle While suspending coating supply for a nozzle at the time of a spreading halt, the coating of the slit outlet section of between a nozzle and base materials and a nozzle can be compulsorily drawn in the interior of a nozzle, and also when there is much coverage, an edge can be made linear always [spreading]. Furthermore, since the coating flows to places other than a nozzle by the return way, the pressure of a coating supply means does not increase and the pressure can be made equivalent to the usual pressure at the time of resumption of spreading, the impasto at the time of resumption of spreading can be controlled.

[0186] Moreover, according to the intermittent method of application of this invention, it has the spreading process and spreading halt process which apply the coating which supplied the coating to the nozzle with an intermittent means to supply intermittently on the base material which carries out continuation transit. At the same time a spreading halt process intercepts the flow of said coating to said nozzle and it leads in addition to said nozzle Said coating of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle. A spreading process Said coating attracted in said predetermined location while opening the flow of said coating to said nozzle is returned to said interior of a nozzle. The amount of said said coating attracted Per slit width of 10mm of said nozzle, Since it carries out to 3 or more [0.1mm] and 3 or less [500mm] and spreading formation of said coating is intermittently carried out on said base material, the amount of the coating compulsorily drawn in the interior of a nozzle at the time of a spreading halt by carrying out to three or more [0.1mm / per slit width of 10mm] The coating of the outlet section of the slit of between a nozzle and base materials and a nozzle can be certainly attracted inside a nozzle at the time of a spreading halt. When returning to a nozzle the coating attracted in the predetermined location inside a nozzle at the time of resumption of spreading by furthermore making said amount or less [500mm] into three, while extruding the inside of a slit toward an outlet, it can control involving in air into a coating. Consequently, also when there is much coverage, an edge can be made linear always [spreading].

[0187] Moreover, according to the manufacture approach of the cell electrode of this invention, it has the spreading process and spreading halt process which are applied on the charge collector which carries out continuation transit of the active material paste supplied to the nozzle with the intermittent means. A spreading halt process intercepts the flow of said active material paste to said nozzle. Said active material paste of said interior of a nozzle and the slit outlet section is attracted in the predetermined location established in the interior of said nozzle at the same time it leads in addition to said nozzle. And a spreading process Said active material paste attracted in said predetermined location while opening the flow of said active material paste to said nozzle is returned to said interior of a nozzle. Since spreading formation of said active material paste is intermittently carried out on said charge collector, by forming an uncoated portion crosswise [of a charge collector] intermittently While reducing a man day and being able to improve productivity, the adhesive property of the boundary section of an active material layer and a charge collector can be improved, and the cell which improved cell properties, such as discharge capacity, a rate property, and a cycle property, can be obtained.

[0188] Moreover, according to the nonaqueous electrolyte cell of this invention, since the cell electrode created by the manufacture approach of the above-mentioned cell electrode was used, the cell which improved cell properties, such as discharge capacity, a rate property, and a cycle property, can be obtained.

[Translation done.]

* NOTICES *

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The sectional side elevation at the time of spreading of the intermittent coater of the gestalt 1 of operation of this invention

[Drawing 2] The sectional side elevation at the time of a spreading halt of this intermittent coater

[Drawing 3] The sectional side elevation of the nozzle of the intermittent coater of the gestalt 2 of operation of this invention

[Drawing 4] The sectional side elevation at the time of spreading of the intermittent coater of the gestalt 3 of operation of this invention

[Drawing 5] The sectional side elevation at the time of a spreading halt of this intermittent coater

[Drawing 6] The perspective view of the head of this intermittent coater

[Drawing 7] With the C-C sectional view in the gestalt 3 (drawing 5) of operation of this invention

(a) is drawing which prepared the return way on the peripheral surface of a head.

(b) is drawing which made the return way penetrate inside a head.

[Drawing 8] The sectional side elevation of the head of the intermittent coater of the gestalt 4 of operation of this invention

[Drawing 9] The sectional side elevation of the head of the intermittent coater of the gestalt 5 of operation of this invention

[Drawing 10] The sectional side elevation at the time of spreading of this intermittent coater

[Drawing 11] The sectional side elevation at the time of a spreading halt of this intermittent coater

[Drawing 12] The sectional side elevation at the time of a spreading halt of the equipment of the intermittent method of application of the gestalt 7 of operation of this invention

[Drawing 13] The sectional side elevation at the time of spreading of the equipment of the intermittent method of application of the gestalt 8 of operation of this invention

[Drawing 14] The sectional side elevation at the time of a spreading halt of the equipment of this intermittent method of application

[Drawing 15] The top view of the intermittent paint film by the conventional intermittent coater

[Drawing 16] The top view of the intermittent paint film by the intermittent coater of this invention

[Drawing 17] The discharge voltage property Fig. of the cell using the electrode manufactured by the manufacture approach of the cell electrode of the gestalt 10 operation of this invention

[Drawing 18] The property Fig. showing the discharge capacity change when performing cycle-life measurement of the cell using the electrode manufactured by the manufacture approach of this cell electrode

[Description of Notations]

1 Nozzle

2 Head (Intermittent Means)

7 Slit

11 Coating

12 Base Material

13 Roll

25 Suction Section (Predetermined Location)

[Translation done.]

* NOTICES *

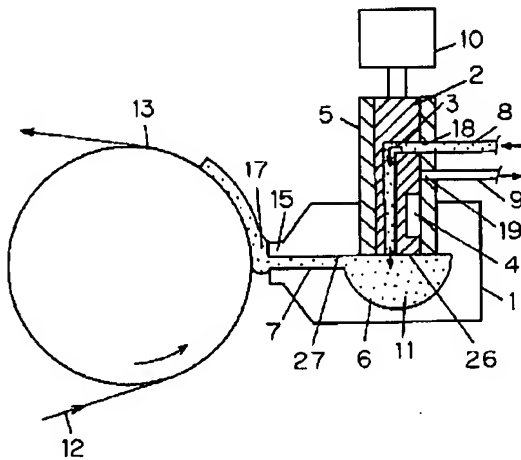
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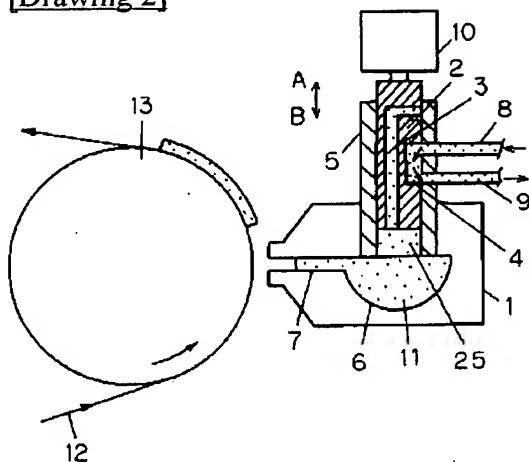
DRAWINGS

[Drawing 1]

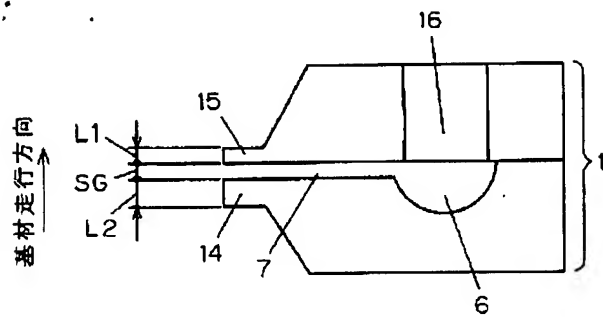
- 1 ノズル
- 2 ヘッド(間欠手段)
- 7 スリット
- 11 塗料
- 12 基材
- 13 ロール



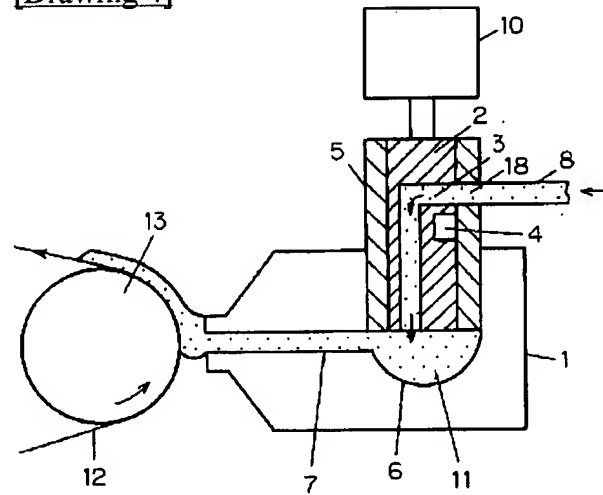
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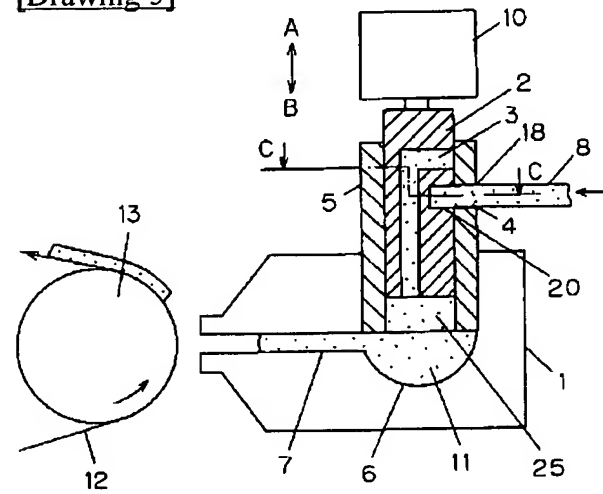
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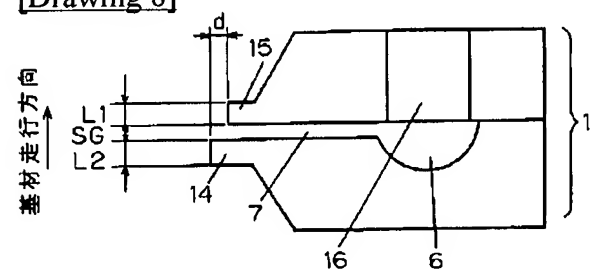
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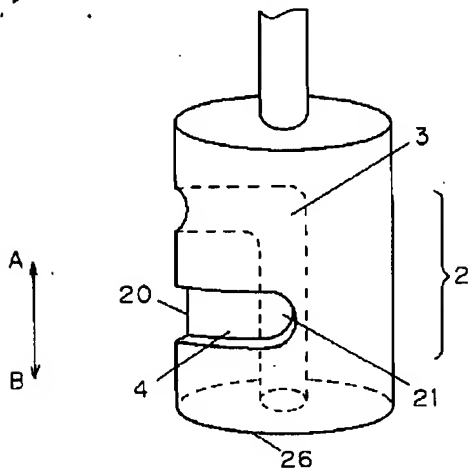
[Drawing 5]



[Drawing 8]

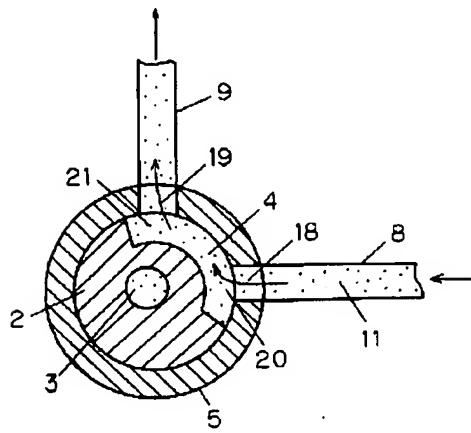


[Drawing 6]

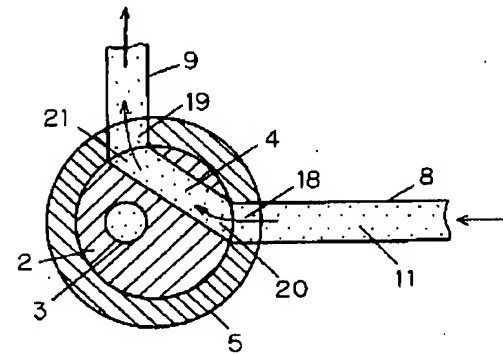


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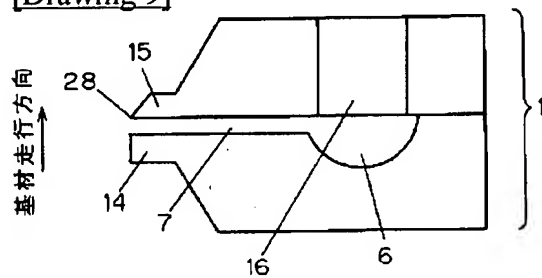
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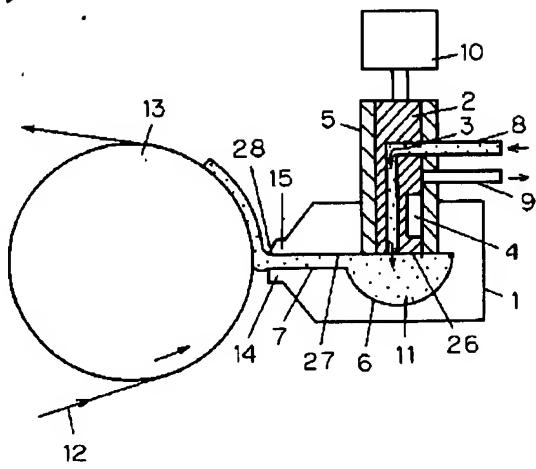
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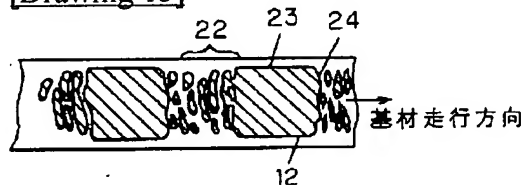
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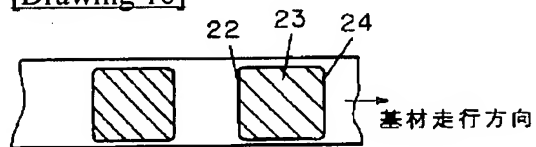
[Drawing 10]



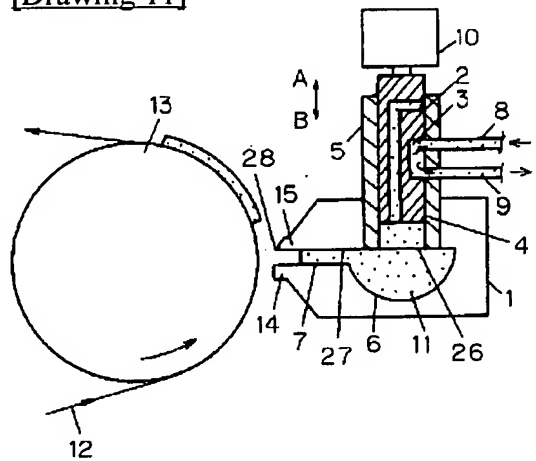
[Drawing 15]



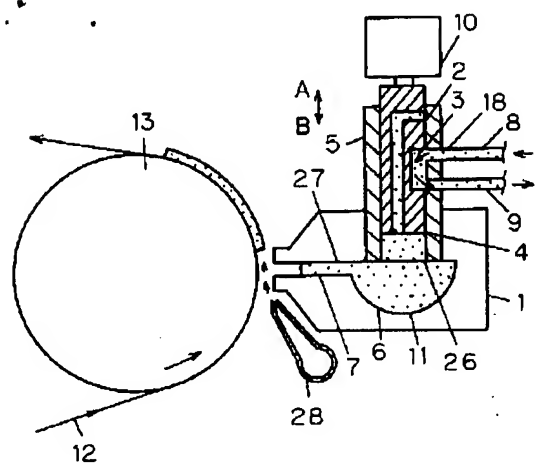
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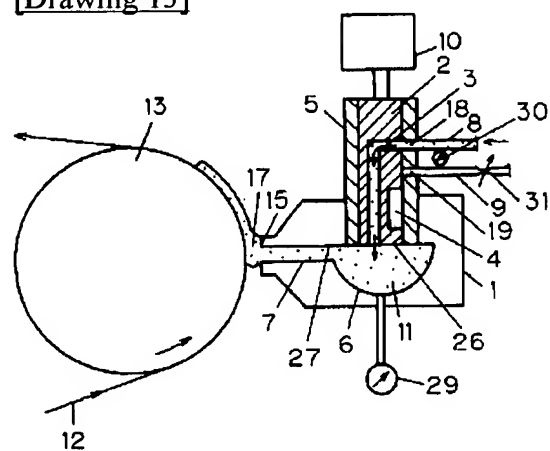
[Drawing 11]



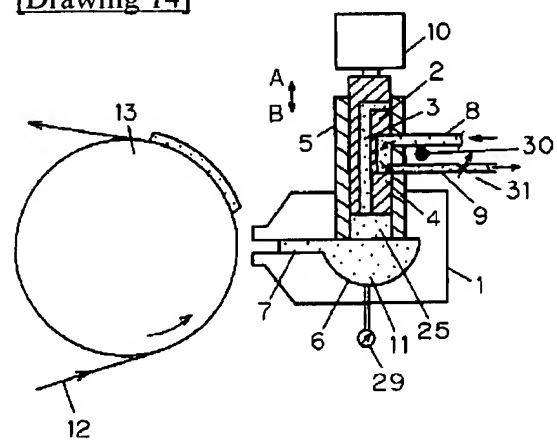
[Drawing 12]



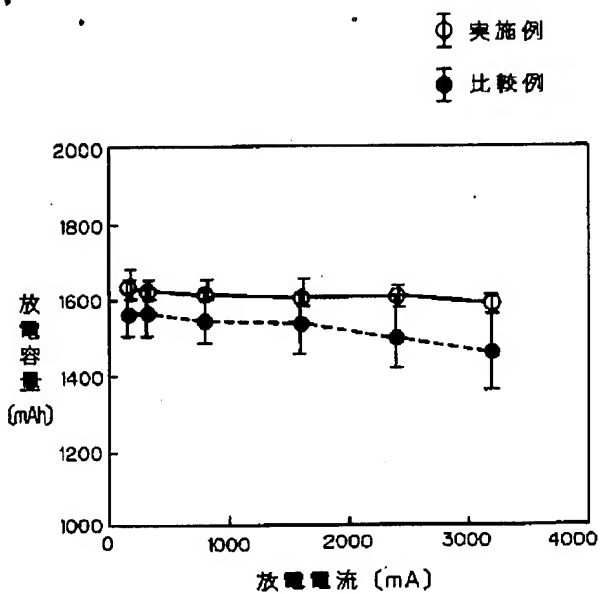
[Drawing 13]



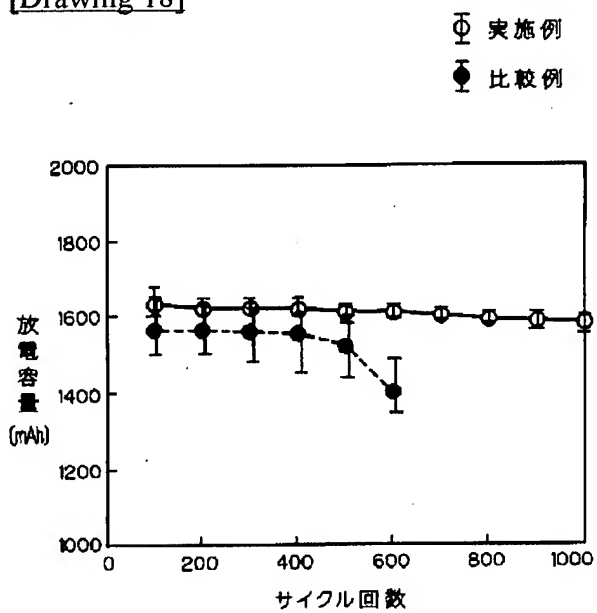
[Drawing 14]



[Drawing 17]



[Drawing 18]



[Translation done.]